

**FAIRBANKS-MORSE**

**WATER SYSTEMS**

*for  
Shallow  
and  
Deep Well  
Service*

**FAIRBANKS, MORSE & CO.**

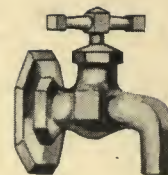
CATALOG H-405

## PRICES F. O. B. BELOIT, WIS.

Unless otherwise indicated, all prices given in this catalog are F.O.B. Beloit, Wis. (Pneumatic tanks are F.O.B. Chicago or Conshohocken, Pa. Septic tanks are F.O.B. Perry, N. Y.) When shipment is made from any of the Fairbanks-Morse Branch distributing points the following additions should be made per 100 lbs.:

FOR SHIPMENT FROM WAREHOUSE LISTED BELOW	ADD PER 100 LBS. FOR FREIGHT		
	Pumps (F.O.B. Point—Beloit)	Pressure Tanks (F.O.B. Points—Conshohocken, Pa. (Philadelphia) and Chicago)	Septic Tanks (F.O.B. Point— Perry, N. Y.)
Atlanta	\$2.00	\$2.00	\$2.00
Baltimore	1.20	No Addition	1.20
Boston	1.50	Tanks 525 gal. and smaller. No addition. Others add \$1.20 per cwt.	1.20
Chicago	.57	No Addition	1.30
Cincinnati	1.00	1.00	Served from Perry, N. Y.
Cleveland	1.00	1.00	Served from Perry, N. Y.
Dallas	1.50	2.50	3.00
Denver	1.75	1.75	3.50
Des Moines	1.08	1.00	2.00
Detroit	1.32	Served from Chicago	Served from Perry, N. Y.
Jacksonville	2.00	2.00	2.25
Kansas City	1.00	1.00	2.00
Los Angeles	2.50	1.50	2.50
Milwaukee	.57	Served from Chicago	Served from Chicago
New Orleans	2.50	2.00	2.25
New York	1.20	Served from Conshohocken	1.20
Omaha	1.31	1.00	2.00
Philadelphia	1.20	No addition	1.20
Pittsburgh	1.10	1.00	Served from Perry, N. Y.
Portland	2.50	2.50	2.50
St. Louis	1.00	1.00	1.50
St. Paul	1.15	1.00	1.50
Salt Lake City	3.50	2.50	3.50
San Francisco	2.50	1.50	2.50
Seattle	2.50	2.50	2.50





# FAIRBANKS-MORSE

## WATER SYSTEMS



A Complete Line of Pumps for  
Shallow and Deep Well Service



For supplying water under pressure from any source, to Farm, Town, Suburban and City Homes; Country Clubs; Golf Clubs; Rural Estates; Green Houses and Nurseries; Country Schools and Churches; Dairies; Mills; Factories; etc. Also for use as boosters in Apartment Houses; Hotels; Hospitals; Public Buildings; Office Buildings; etc.



CATALOG H-405

# FAIRBANKS, MORSE & CO.

MANUFACTURERS  
CHICAGO, ILLINOIS

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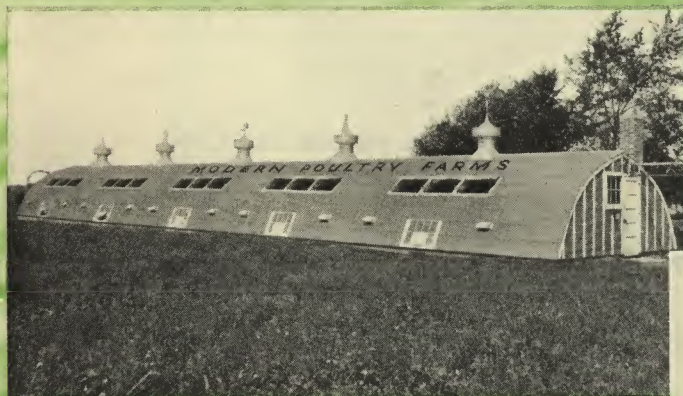


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"FOR THIRSTY MAN AND BEAST—"

Water! Clear, pure and abundant—the vital necessity for every living thing! The manufacturing and selling of water supply systems is a service without which modern life could not continue for long.



# Sell Running Water Under Pressure

---and in every home there is a salesman to help you

Think back for a moment about WATER! The most primitive and uncivilized of men would never have thought of building the rudest of homes *except* close to an abundant supply of water. An instinct before science said that water must be pure. Then, consider WATER as mankind learned to live better—as a due regard for cleanliness and sanitation and the husbandry of animals made water an ever-increasing need of living. No longer would a nearby stream or the occasional water-hole suffice! Man's needs for water have grown so large that he must find means

to bring it to him. And from this need came the crude water supply systems of the ancients.

NOW!—look around the community in which you live. In each home—in each place of business—on each farm there exist many and varying needs for RUNNING WATER UNDER PRESURE! And in each of these places where a means for supplying running water is lacking or is inadequate, the Fairbanks-Morse Dealer has a prospect of a sale. And within each of these places he is sure of someone who will gladly aid in making that sale, because in all such places there is at least one person—very likely more than one—carrying a laborious burden due to the lack of modern running water facilities.

Speak to the farm wife who each day must pump and carry

It's easier on the mother and better for the boy when he can take a bath this way.



the many gallons of water which her family and home require. Ask her on a freezing winter morning as she thaws a frozen pump if she would like running water at the turn of her hand within the warmth of her kitchen. Would she help you sell a Fairbanks - Morse Home Water System? Then talk to her husband as at the end of a hard day in the fields he is pumping water for horses and cattle. Is it a welcome chore to him? Does he look forward to doing it every day of his life to come? Or would he prefer



Remember in selling home water systems—the woman at the pump wants to be the woman at the sink.





▼ ▼ ▼  
 RUNNING WATER UNDER PRESSURE is a vital requirement of healthful, sanitary living.  
 ▼ ▼ ▼

turning a valve handle and letting a Fairbanks-Morse Home Water System do it for him as he enters his home for the evening meal and rest?

ducing fire risk. With running water under pressure, the person discovering the fire can at once direct a steady stream of water at the base of the blaze.

▼ ▼ ▼  
 A farm home burns every fifteen minutes somewhere in the United States. Your prospect's home may be next.  
 ▼ ▼ ▼



Then consider the matter of fire hazard. The value of the home and other buildings that comprise the average suburban or farm home, runs into thousands of dollars. Such an investment is worthy of the best protection that can be secured. A comparison of the losses in property with and without city service proves homes with water pressure protection are many times safer from fire.

Early, effective action is the secret of preventing loss after a fire has started. This is the reason that F-M Home Water Systems are so valuable in re-

They need not lose valuable time frantically calling for help. There is no delay going to and from the pump. A turn of a faucet gives them water

under pressure instantly.

A farm building burns every fifteen minutes somewhere in the United States. Your prospect's home may be next. Tell him that fire prevention is far better than fire insurance. It is impossible to insure legally property for its complete replacement cost. Considering the material value alone, fire is always costly. But fire cost in the home cannot be reckoned in dollars and cents. Insurance cannot restore irreplaceable treasures; it cannot protect against the suffering of loved ones.

Go into any home which does not have running water, ask those whose joy in living is lessened by the lack of a Home Water System. Show them how little their sacrifices are actually saving. Tell them how easy and how little it costs for a Fairbanks-Morse Home Water System. *They* will aid you in loosening the purse strings, if aid is needed. They will become your powerful allies on the job every hour in that home to make a sale for you. Enlist their aid to your profit.

▼ ▼ ▼  
 A Fairbanks-Morse Home Water System means time off to enjoy life.  
 ▼ ▼ ▼







"WHEREVER THERE IS LIFE, THERE IS NEED  
FOR RUNNING WATER."

Wherever human beings stay or go, there is a market for Fairbanks-Morse Home Water Systems. F-M Water Systems are made in a variety of sizes for every requirement—domestic, agricultural and industrial.

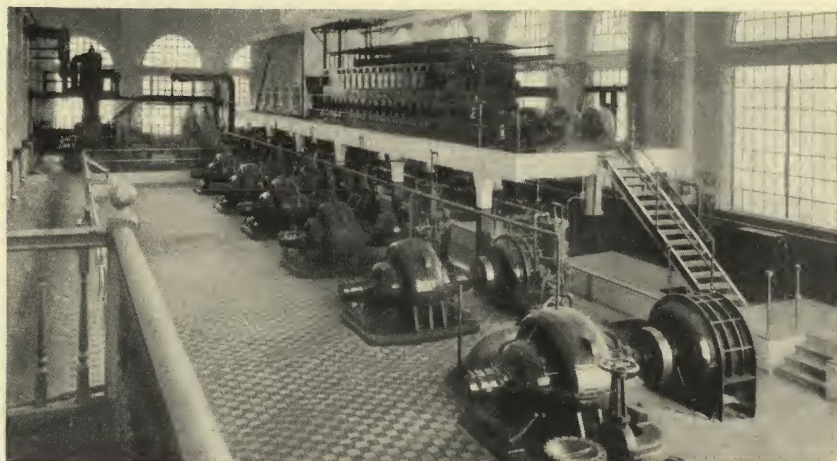


# 336,000,000 gallons for a city



It may be a gigantic city pumping station furnishing many millions of gallons of water per day for many thousands of people—or it may be a suburban or farm home where a family's water needs are small by comparison. But Fairbanks-Morse serve both and regard them as equally important.

Whether the demand is for millions of gallons to serve the municipality or for merely sufficient water to meet the needs of a farm or suburban home, F-M pumping equipment is chosen with the same assurance of lasting dependability. On sheer merit F-M pumps, motors and engines have built a reputation that serves as a reliable guide to equipment buyers in every field.



These six huge F-M Centrifugal Pumps installed in the Torresdale Pumping Station at Philadelphia have a capacity of 336 million gallons per day. They are driven by F-M Ball Bearing Motors.

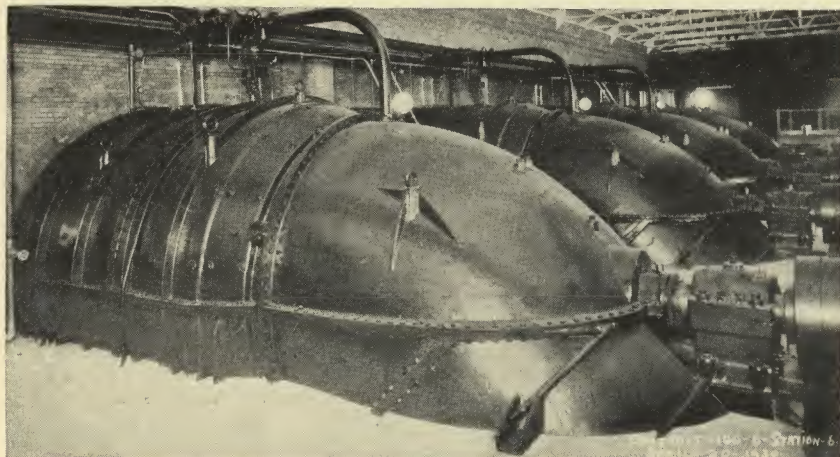
Fairbanks-Morse Home Water Systems are built to the same rigid standards of quality, workmanship and advanced design as are the mammoth F-M units used in municipal and industrial installations. The same

F-M guaranty assures satisfactory, year-in and year-out performance whether the unit is used in a farmhouse or installed in a municipal structure covering a city block.

Consider these facts from the standpoint of your own profits as a dealer. Think of the added value of the Fairbanks-Morse franchise—the selling advantage that you enjoy by handling water systems built by an organization whose reputation is



Four of the six 14-foot Fairbanks-Morse Screw Pumps used in Metairie Pumping Station No. 6, New Orleans, La.—the largest capacity pumping station in the world. The capacity is more than two billion gallons per day.





# or 200 gallons for a home



so well and favorably known to every prospective buyer. Inevitably, Fairbanks-Morse leadership is reflected in increased sales for dealers.

Here is *another* important advantage that leads to wider sales and greater profits for Fairbanks-Morse dealers. F-M Water Systems are built in sizes and combinations to meet every water pumping requirement. No sales are lost because of inability to supply the exact type of equipment demanded. From 200 gallons an hour and up, F-M Water Systems are available—both in motor and engine driven models—for shallow well, deep well, lake or cistern installations.



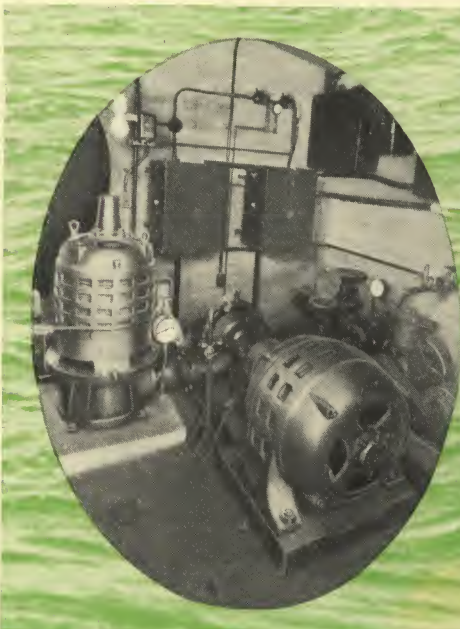
The low price of this 200 gallon per hour F-M Water System puts running water within the reach of the most modest home.

Fairbanks-Morse Home Water Systems are offered at favorable prices, made possible

only by F-M volume production. Every unit is covered by a *single* dependable guaranty because Fairbanks-Morse build both pumps and power. A complete supply of parts is maintained at all Fairbanks-Morse branches.

Dealers who handle the F-M line of water systems have at their command *all* the elements necessary for profitable business in volume.

The new models of F-M Home Water Systems shown in this catalog and the attractive prices at which they are sold offer F-M Dealers the greatest opportunity ever—for increased sales and profits.



Country clubs, golf clubs and subdivisions are enthusiastic users of F-M water systems. This shows an F-M deep well turbine pump assembled with an F-M centrifugal booster pump. Installation Edgebrook Country Club Subdivision, Rockford, Illinois.



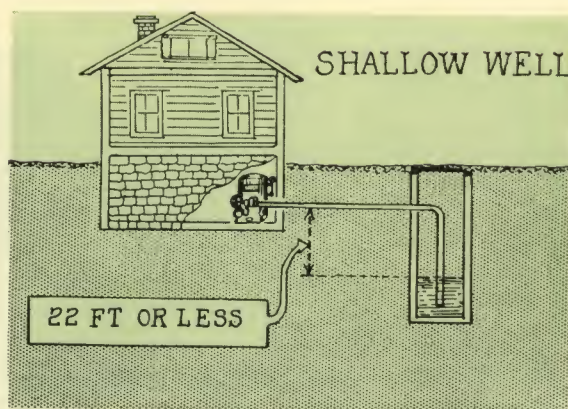
# When to use a Shallow Well Pump

The information on these few pages and those in the back part of this book will be found to be of great assistance in determining the kind and size of Fairbanks-Morse Water Systems best suited for any requirement.

There are two general classes of pumps—the shallow well type and the deep well type. In order that you may know what type of pump to recommend, the first thing to do on any pumping job is to ascertain the maximum distance from the inlet opening of the pump to the lowest level the water will drop in the cistern, well or other source of supply while the pump is being operated at the delivery rate required. The lowest level must be considered, because it is possible in many cases to strike water at a depth of say 20 feet, but once the pump gets into operation the water level falls very rapidly with the result it is soon out of reach of the pump, and all the pump can do is to pump air until the well again fills up.

If this maximum distance is found to be 22 feet or less, a

Fig. 1. The shallow well type of pumps operates on the "suction" principle. The maximum distance from lowest water level to pump is 22 feet or less.



pump that operates on the "suction" principle may be used. These are called either "suction" pumps or "shallow well" pumps.

In the action of the shallow well pump we have an interesting application of the pressure of the atmosphere. At sea level the pressure of the atmosphere is 14.7 pounds per square inch, or roughly speaking 15 pounds.

This means that at sea level there is approximately 15 pounds per square inch pressure against every object on the earth—it is pressing against the sides of buildings—the roofs of buildings—and the only reason the buildings do not collapse or the roofs cave in is that an identical pressure is being exerted from the inside. As the elevation increases the pressure of the atmosphere decreases (see Figure 2).

The illustration on the next page shows a simple, valve-in-plunger type force pump which illustrates a good many of the principles employed in shallow well pumping. On the upstroke of the plunger a partial vacuum is created in the cylinder. The atmospheric pressure (14.7 pounds per square inch) then forces the water through the suction pipe into the cylinder. On the downstroke, the valve at

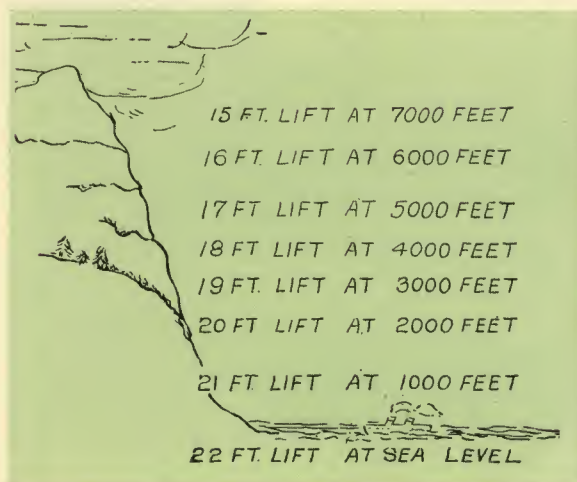


Fig. 2. The maximum lift of shallow well pumps depends entirely on the atmospheric pressure.



the suction pipe closes but the valves in the plunger open, letting the water go through to the top part of the cylinder. On the next upstroke the plunger valves close forcing the water through the discharge pipe to the pressure tank or wherever it is to go. The stuffing box "a" is to prevent leakage at the piston rod. The air chamber is to provide an elastic cushion of air to eliminate the water hammer or knock that would otherwise occur due to the fact that water itself is incompressible and therefore offers stubborn resistance to any outside force expended upon it. Air with its elastic characteristics, therefore, is essential in the successful operation of any pressure system.

### Double Acting Pump

In the double acting pump illustrated on this page we have two suction valves (S-1 and S-2) and two discharge valves (D-1 and D-2) so that water is admitted at one end of the cylinder at the same time that it is being discharged from the other end.

This diagram drawing gives a good idea of the operation of the Fairbanks-Morse Water Systems for shallow wells. In actual installation the entire box is filled with water even when the pump is standing still. In other words, all four valves would be covered with water so that when the piston is put into motion the pump will start immediately to deliver its full discharge. A pump with valves thus submerged with water is

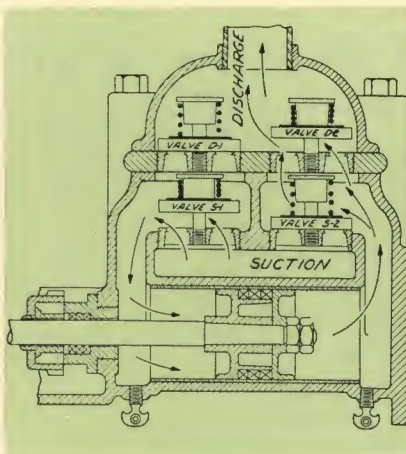


Fig. 3. Cross section of a double-acting pump showing direction of water flow.

▼ ▼ ▼

said to be "primed."

In the illustration of the cross section of the double acting pump shown on this page, as the plunger moves to the right the suction created opens the suction valve S-1 and allows the cylinder to fill with water. At the same time the water to the right of the cylinder is forced under pressure through the discharge valve D-2 into the discharge line. On the return motion, suction valve S-2 opens and the water is forced out through discharge valve D-1, this cycle repeating itself as long as the pump is in operation.

### Maximum Lift Of Shallow Well Pumps

This depends entirely on the pressure of the atmosphere. One pound of pressure per square inch will force water 2.31 feet. Atmospheric pressure is considered to be 14.7 pounds per square inch at sea level. Theoretically, therefore, a suction pump should lift water  $14.7 \times 2.31$  or approximately 34 feet. In practice it is not

possible to get a perfect vacuum in the pump cylinder so that the effective atmospheric pressure is in reality less than 14.7 pounds per square inch. It is customary to consider 22 feet a safe maximum lift to use for the suction pump. At levels higher than sea level this lift will be reduced as illustrated in Figure 2.

### Long Suction Pipes Further Reduce Lifting Power Of Pumps

A long suction pipe (which, by the way, should always slope up toward the pump throughout its entire run — never downward) will decrease the lifting power of the pump according to the table on page 13. The determining factors are the length of suction pipe, its diameter and the size of the pump being used (namely the amount of water flowing through the pipe).

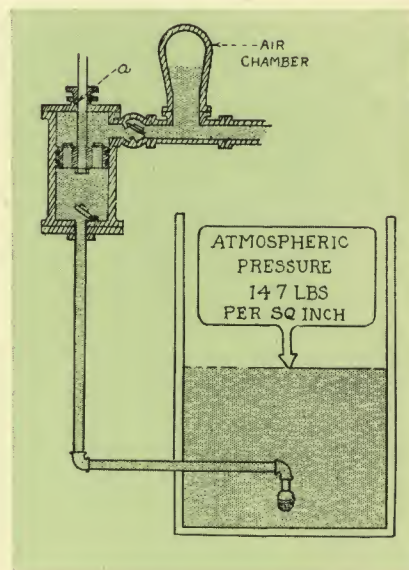


Fig. 4. Diagram drawing showing a simple valve-in-plunger type force pump. The stuffing box "a" is to prevent leakage at the piston rod.



## Some Typical Shallow Well Installations

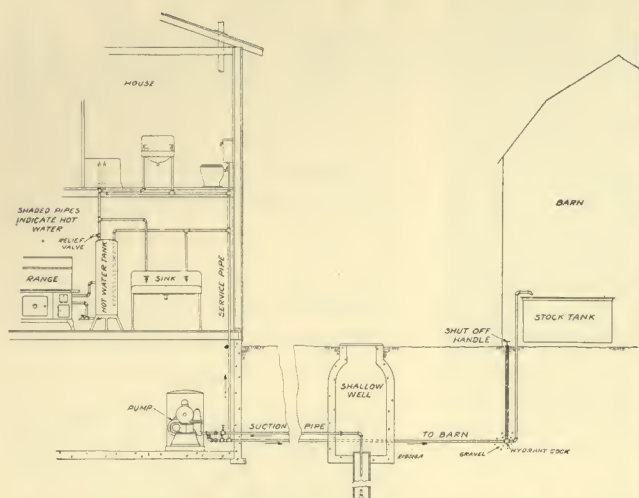


Fig. 5. Installation showing electric pump in basement of home.

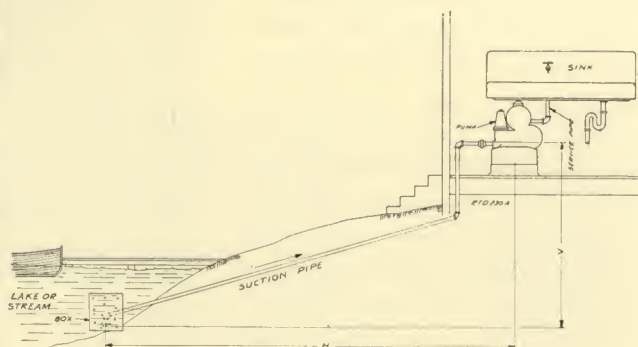


Fig. 6. An inexpensive installation for lakeside cottage.

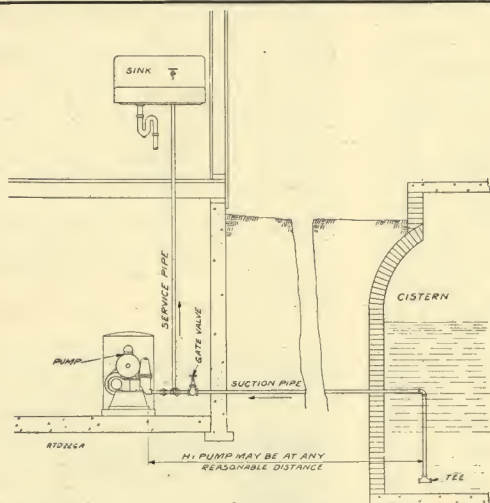


Fig. 7. Installation showing an excellent type of cistern installation.

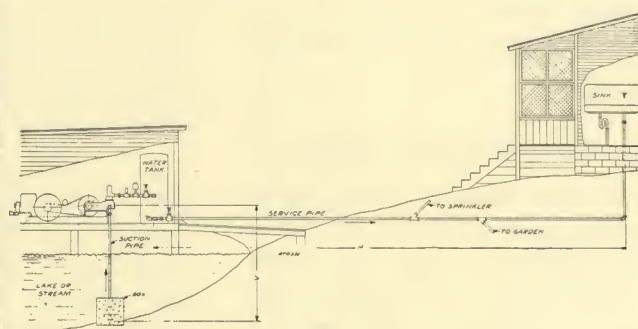


Fig. 8. Engine operated pump installation; source of supply, lake.

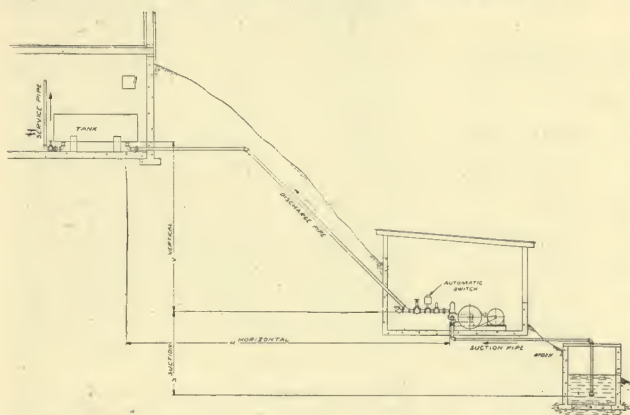


Fig. 9. Installation showing pump near source of supply and tank in home.

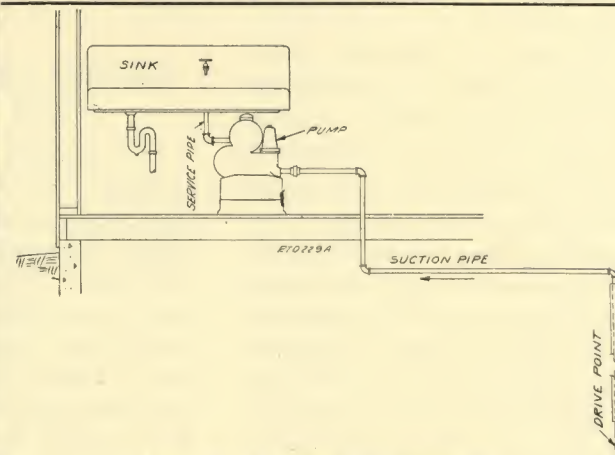


Fig. 10. A drive point installation.



Cap. of Pump Gal. Per Hour	Size of Suction Pipe, In.	Total Length of Suction Pipe					
		30' or Less	50'	100'	200'	300'	400'
200	* 3/4	20	18	15	.....	.....	.....
	1	21	21	20	18	16	14
	1 1/4	22	22	21	21	20	19
250	*1	21	20	20	18	16	14
	1 1/4	22	22	21	21	20	19
	1 1/2	23	23	22	22	21	20
500	1	19	18	14	12	.....	.....
	*1 1/4	21	20	19	17	15	12
	1 1/2	22	21	21	20	19	18
600	1	18	16	10	.....	.....	.....
	*1 1/4	21	20	19	16	13	10
	1 1/2	22	21	21	19	18	16
1000	1 1/4	18	16	10	.....	.....	.....
	*1 1/2	20	19	17	12	.....	.....
	2	21	21	20	18	16	14
1500	*2	21	21	19	16	14	11
	2 1/2	22	22	21	20	19	18
	3	22	22	22	21	21	21
2500	*2 1/2	21	20	19	15	12	.....
	3	22	21	21	19	18	16
5000	*3	21	20	18	14	10	.....
	4	22	21	21	20	19	18

Table showing maximum suction lift in feet for various lengths of smooth wrought iron suction pipe. The size indicated by a star (\*) is the standard suction tap in the Fairbanks-Morse pump of the capacity indicated. This table is on the basis of straight, new, smooth pipe, without elbows. If several elbows were used it would further decrease the lifting power of the pump.

would enable you to build a pressure of about 25 pounds maximum in the storage tank. A 100 pound pump would enable you to build a pressure of 100 minus 40 or 60 pounds maximum in the storage tank, etc.

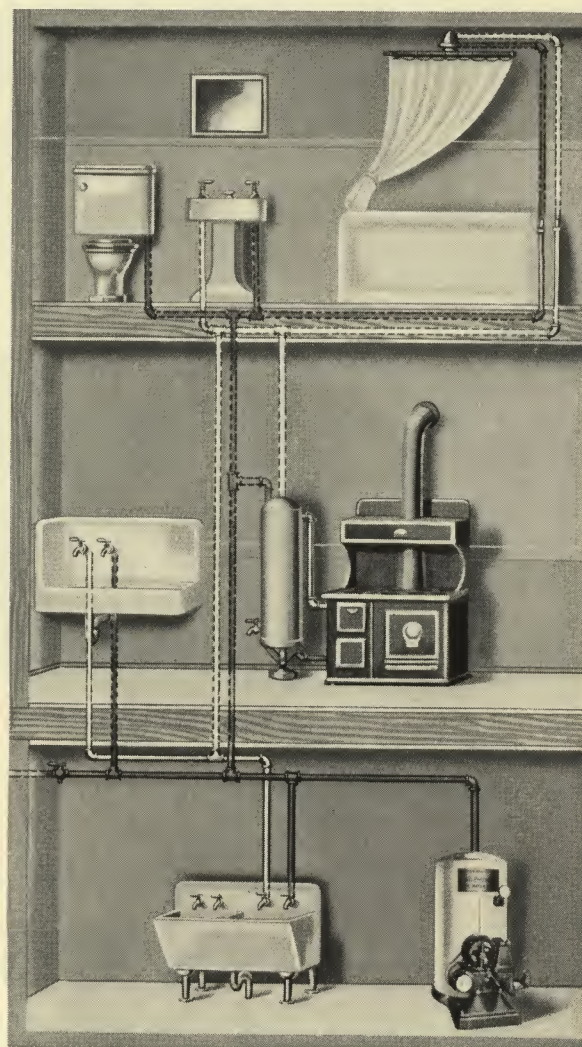
When we tell you the F-M line is complete we mean that we have pumps to take care of any of these field operating conditions. Fairbanks-Morse make complete water systems for pressures as high as 100 lbs; and in capacities as low as 600 gallons per hour at this pressure.

### Forcing Power Of Pressure

It is obvious from the table shown here that if there is a very long distance from the source of supply to the pump it would be advisable to place the pump closer to the source of supply and rely upon the discharge pressure to force the water wherever it is needed. Figure 9 is typical of such an installation.

One pound (per square inch) of pressure will force water 2.3 feet. In order to be safe 2 feet is the figure that is generally used. Therefore, if you have a 40 pound pump you can force the water about 80 feet but if the elevation ("V" in the figure, plus pipe friction) were actually 80 feet a 40 pound pump would not enable you to build up any pressure in the storage tank at the tank level. A 65 pound pump on the other hand,

Fig. 11. A Fairbanks-Morse Water system means the elimination of drudgery in laundry room, kitchen and bath. A typical arrangement of these conveniences is shown here.





# FAIRBANKS-MORSE

## Shallow Well Electric Home Water Systems



Fig. 14. Outfit No. 2005, complete as illustrated. A double acting simplex pump, 200 gallons per hour displacement, mounted on 5 gallon galvanized tank.

### THE "CHALLENGER"

**\$59.50** Retail cash price, f.o.b. factory. Never before has a genuine Fairbanks-Morse Home Water System been offered at such a low price. A complete unit, fully automatic, self contained. A quality pump at a price made possible only by F-M volume, unusually efficient manufacturing methods and world wide distribution.



# The "CHALLENGER"

## 200 Gallons Per Hour

A Genuine Fairbanks-Morse  
Automatic Water System  
at ONLY \$59.50

Now every home equipped with electricity—no matter how modest—can enjoy the convenience, pleasures and advantages of having running water under pressure just like city water service—and at a fraction of city water cost.

This is made possible by another great F-M triumph in home comfort equipment—a big capacity water system that gives faucet service *instantly*, when and where wanted — an automatic unit that can be installed in a minimum of space and then practically forgotten — priced to give the greatest value ever offered in home water system history!

This Fairbanks-Morse Home Water System is for small homes, summer cottages, etc., and will meet the ordinary water requirements of the average home of 5 persons.

The pump is of the reciprocating, double acting type; practically noiseless in operation. Extremely compact—only 19 inches in diameter and 22

inches high—so compact in fact that it may be placed under a kitchen sink if desired.

### Automatic, Self Oiling

This system is completely automatic in operation—starting automatically when the pressure in the five gallon galvanized tank drops to 20 pounds; stopping automatically when the tank pressure is built up to 40 pounds.

The pump has but one place to oil. The crankcase serves as the oil reservoir and the oil needs to be changed only about once a year.

### Air Valve

An air valve conveniently located in the bonnet, makes it easy to admit air into the system in case of water logging.

### Pump Details

The pump has a two bearing, drop forged steel crankshaft, bronze connecting rod and connecting rod bearings, and a tobin bronze piston rod. Piston is of double cup leather type.

The valves are of durable, flexible rubber, spring operated. There are two suction and two discharge valves, all being

for lifts of 22' or less  
quiet---no gears  
extremely compact

mounted on the same plate.

A drip arrester on the piston rod prevents the water from the pump working along the rod into the crankcase.

The removal of one stud bolt in the pump bonnet provides quick and complete access to the valves, gaskets, etc.

An outside relief valve, set to open at 65 pounds pressure, protects the system from over-pressure if the motor control switch fails to open quickly enough.

Overload protection in the form of a thermal relay, can be attached to the motor at only a slight additional cost. This device trips automatically and opens the line circuit in case of trouble. It has no fuses — nothing to "blow"—nothing to replace. A push of the button and the relay is reset!

A strainer, located in the suction passage prevents foreign matter from getting into the water box.

In every detail the pump is modern. It is quality-built through and through. It possesses features not to be found even in pumps of a much higher price range—and its price—complete—is well within the reach of the modest purse!

### "Challenger"—200 Gallons per Hour Displacement

Suction Tap in Pump 3/4 Ins.

1/6 H.P. Motor

Discharge Tap 3/4 Ins.

Outfit No.	DESCRIPTION	Approx. Floor Space, Inches	Height Overall, Inches	Approx. Shipping Weight Lbs.	Code Word	Price
2005	Pump Mounted on 5 Gal. Galv. Tank.....	19" Dia.	21½	105	VGZAW	\$59.50
2005-R	Ditto, with Protective Relay on Motor.....	19" Dia.	21½	105	VGZBX	61.00

**MOTOR AND DRIVE:**—Standard outfit includes 110-220 volt, 60 cycle, single phase motor. If a direct current or special cycle motor is needed it can be furnished in place of the standard motor at a small additional cost. See page 84. The drive is the F-M Flex-Mor "V" belt; requiring no oil or belt dressing. It is quiet, positive in its grip, efficient.



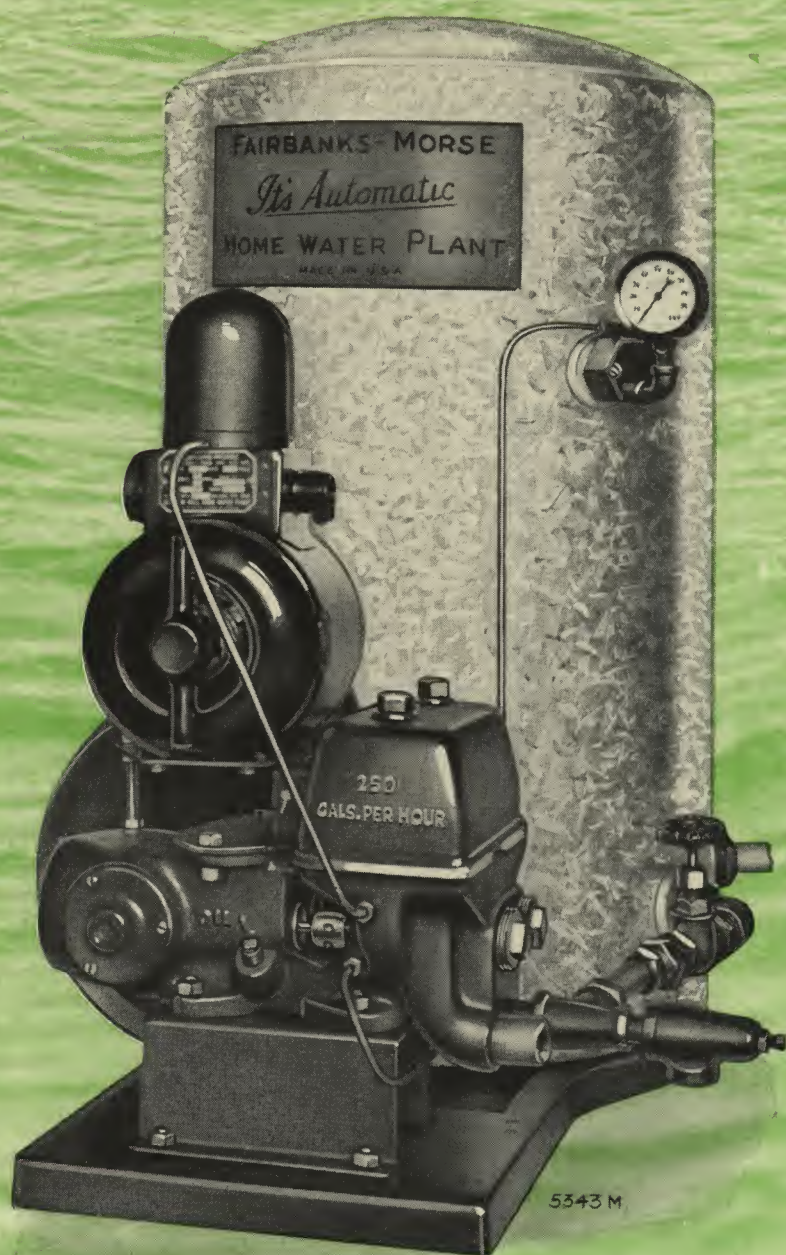


Fig. 15. Outfit No. 2535, complete as illustrated. 250 gallon per hour capacity, duplex, double acting pump, with 35 gallon tank, pump-to-tank piping, etc.

The New Fairbanks-Morse Home Water System in 250 gallons per hour size, shown here is an ideal size pump for all general shallow well pumping service. The 35 gallon galvanized tank is close-connected to the pump on a neat steel base. Copper and brass piping is supplied between the pump and tank, including brass globe valve, outside relief valve. Air volume control and pressure gauge furnished with all tank systems as regular equipment. Protective relay in base of motor control switch affords automatic overload and low voltage protection to motor. Fitted for conduit wiring connection—no exposed wiring. An unusually high grade water system of advanced construction at a low price.



## Fairbanks-Morse 250 Gallons per Hour Electric Home Water Systems

▼ ▼ ▼  
duplex,  
automatic  
self-oiling  
quiet---no gears  
▼ ▼ ▼

The Fairbanks - Morse Home Water System in the 250 gallon per hour size, is recommended for the average home water service demand and is suitable for any cistern or shallow well pumping where the lift does not exceed 22 feet.

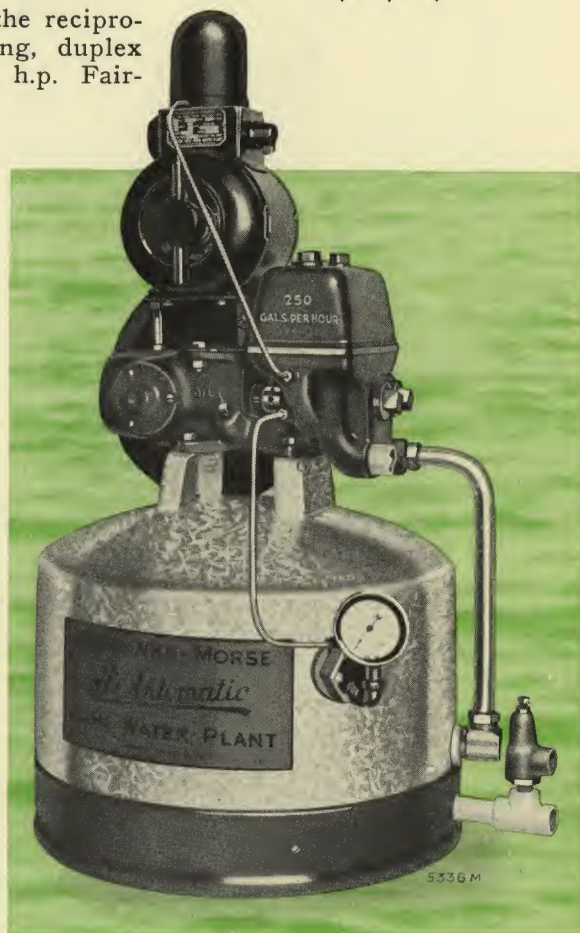
It is furnished only for electric drive and in three different styles. The first, shown on the previous page, is mounted on a pressed steel base close coupled to a 35 gallon galvanized tank. It is complete in every way even including the pump-to-tank piping and all necessary fittings, air volume control, motor control, outside relief valve, etc.

The second modification, shown on this page, is also complete but instead of the 35 gallon tank, the pump is mounted a-top a 12 gallon galvanized tank with decorative base band. The third modification, shown on the next page, consists of the pump, motor, automatic switch and protective relay only, mounted on a substantial pressed steel base, but without tank. It is designed for the man who perhaps has a pump to replace and already has a storage tank.

### Type of Pump

The pump is of the reciprocating, double acting, duplex type with full  $\frac{1}{4}$  h.p. Fairbanks-Morse motor.

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Fig. 16. Outfit No. 2512, complete as illustrated—250 gallons per hour Shallow Well Electric Home Water System—with 12 gallon tank and decorative pressed steel base; automatic air control; motor protective relay mounted in conduit box with conduit fitting—no exposed wiring.  
▼ ▼ ▼



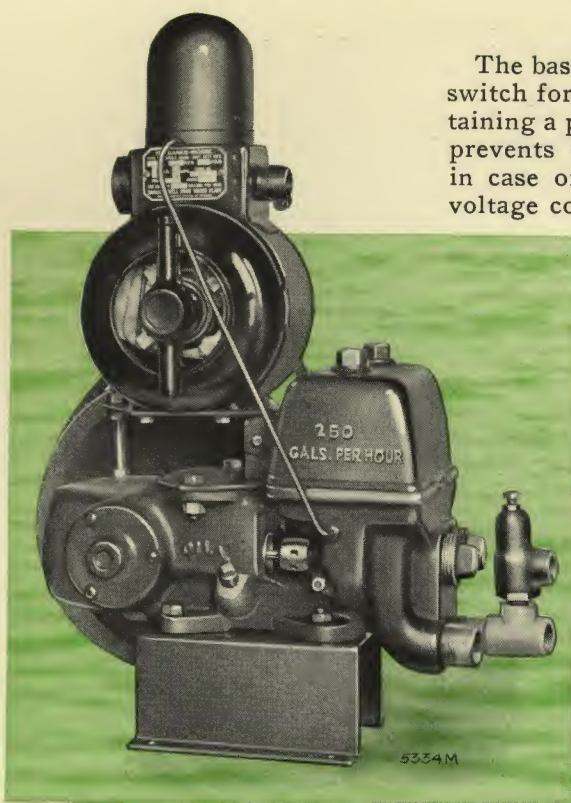
### 250 Gallons per Hour Systems

- |   |   |
|---|---|
| 1. Duplex Double-Acting Pump--No Gears                            | 5. No exposed wiring  |
| 2. Full $\frac{1}{4}$ -H.P. Repulsion 60 Cycle Single Phase Motor | 6. Copper and brass piping between pump and tank              |
| 3. Motor Protective Relay   | 7. Air Volume control with pressure gauge on all tank outfits |
| 4. Fitted for conduit connection                                  | 8. Capacity actual—not displacement                           |

Outfit No.	DESCRIPTION	Approx. Floor Space, Inches	Height Overall, Inches	Suction Tap in Pump, Inches	Discharge Tap in Pump, Inches	Approx. Shipping Weight, Lbs.	Code Word	Price
250-S	Pump on Steel Base—No Tank	16 $\frac{1}{2}$ x12 $\frac{1}{2}$	23 $\frac{1}{2}$	1	$\frac{3}{4}$	100	VGZCY	\$70.00
2512	Pump Atop 12 Gal. Galv. Tank	21 x19 $\frac{1}{2}$	36 $\frac{3}{4}$	1	$\frac{3}{4}$	155	VGZDZ	83.50
2535	Pump with 35 Gal. “ “	23 $\frac{1}{2}$ x31 $\frac{1}{2}$	35	1	$\frac{3}{4}$	195	VGZFA	95.00
2570	Pump with 70 Gal. “ “	23 $\frac{1}{2}$ x31 $\frac{1}{2}$	65	1	$\frac{3}{4}$	230	VGZGC	103.50

**MOTOR AND DRIVE:**— Standard outfit includes 110-220 volt, 60 cycle, single phase motor. If a direct current or special cycle motor is needed it can be furnished in place of the standard motor at a small additional cost. See page 84. The drive is the Flex-Mor “V” belt; requiring no oil or belt dressing. It is quiet, positive in its grip, efficient. A convenient belt take-up is provided.





### Control

The base of the motor control switch forms a conduit box containing a protective relay which prevents damage to the motor in case of an overload or low voltage condition on the line.

▼ ▼ ▼

Fig. 17. Outfit No. 250-S.—250 gallons per hour Shallow Well Electric Pump Unit only. For the man who already has a pressure tank and desires to replace his pump.

▼ ▼ ▼

The pump is designed to pump against a discharge pressure of 40 pounds maximum. Practically noiseless in operation.

### Automatic, Self-Oiling

Operation is automatic. The pump starts when the pressure in the tank drops to 20 pounds and stops when the tank pressure is built up to 40 pounds.

It is also self-oiling. The crankcase serves as an oil reservoir. Oil needs changing only about once a year. Very little attention necessary.

### Tanks

The tanks are carefully made and welded in our own factories, and are thoroughly galvanized both inside and out. Tested for 125 pounds pressure.

### Motor

The motor is an F-M repulsion type, single phase,  $\frac{1}{4}$  H.P. rated on a continuous duty basis.

An air volume regulator is also furnished as standard equipment with all tank outfits. This automatically maintains the proper volume of air in the pressure tank; eliminates the possibility of water logged or air bound tanks; does away with

excessive starting and stopping of the motor and prevents water hammer in the pipe lines.

### Pump Details

Two bearing, drop forged steel crankshafts, bronze connecting rods and connecting rod bearings, tobin bronze piston rods. The pistons are of the double cup leather type.

The valves are of durable, flexible rubber, spring operated. There are four suction and four discharge valves; two suction and two discharge valves being on each plate.

A drip arrester on each piston rod prevents water from the pump working along the rods into the crankcase. Knurled packing nuts on the rods make it easy to tighten the packing.

The removal of two stud bolts in the bonnet (see illustration) provides easy access to the valves, gaskets, etc.—an exclusive Fairbanks-Morse feature.

An outside relief valve, set to pop at 65 pounds pressure, protects the system from overpressure if the motor control switch fails to trip promptly.

A strainer, located in the suction passage, prevents foreign matter from getting into the water box.

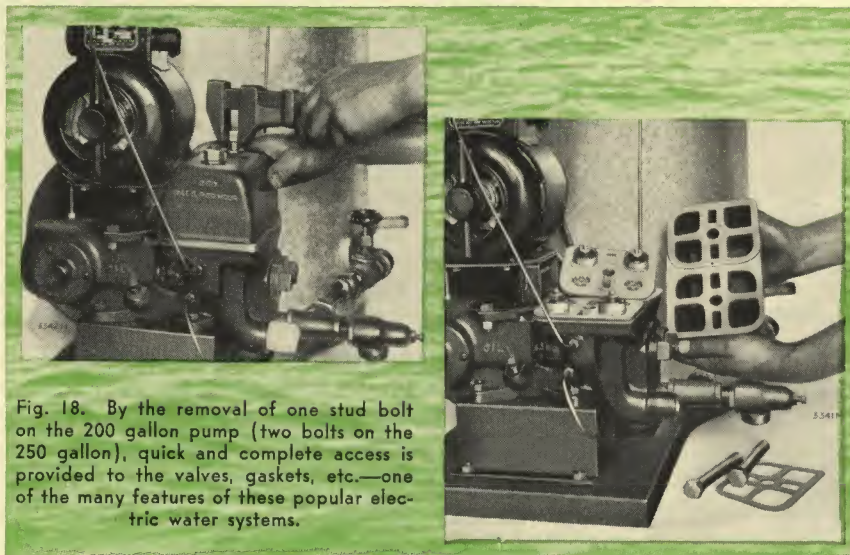
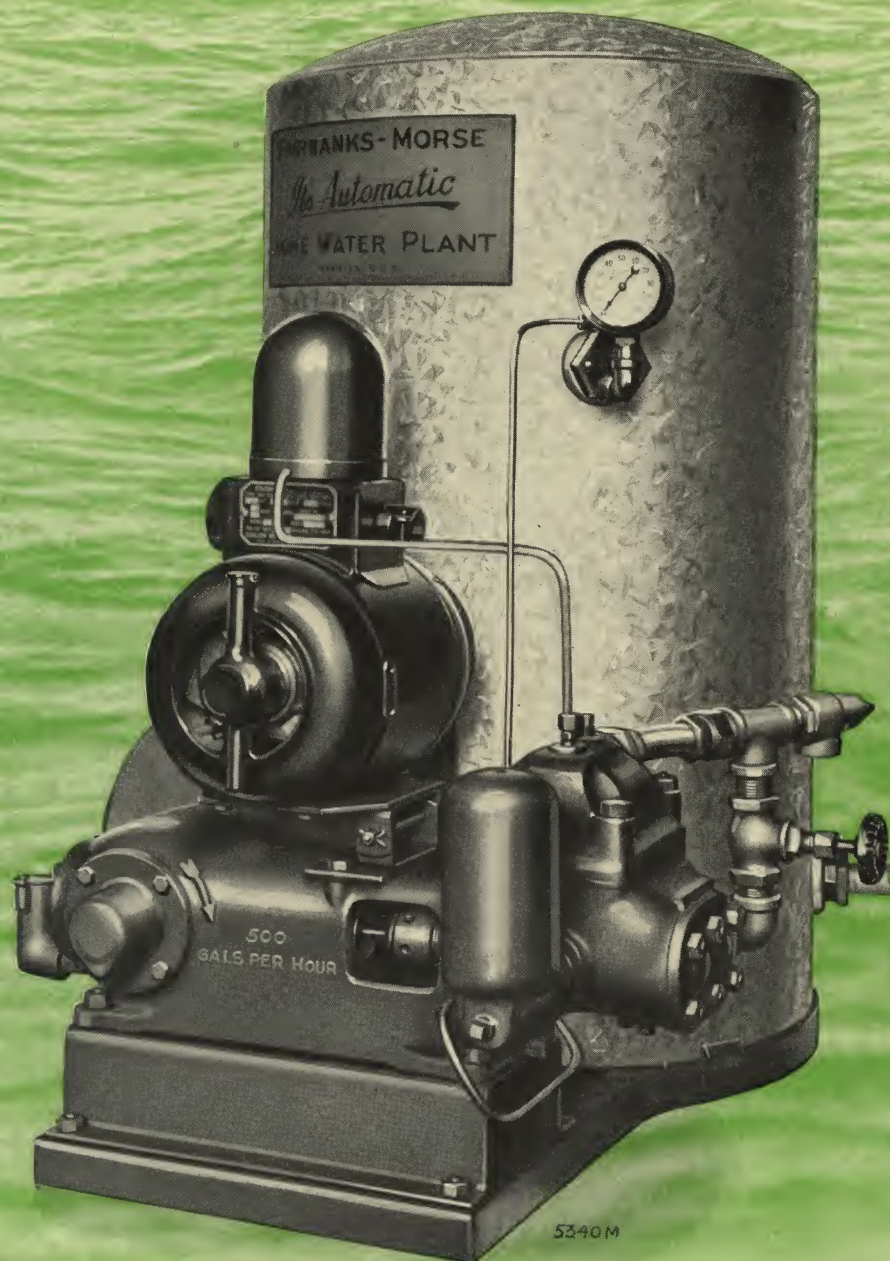


Fig. 18. By the removal of one stud bolt on the 200 gallon pump (two bolts on the 250 gallon), quick and complete access is provided to the valves, gaskets, etc.—one of the many features of these popular electric water systems.





The Fairbanks-Morse 500 gallon Shallow Well Water System pictured above is a heavy duty, large capacity unit recommended particularly for larger residences, estates, country homes, stock farms, etc., where the water demands are unusually severe. Never before has a pump of this substantial design been made part of a water system unit to sell at a popular price. It is a real power pump of construction to be found only in commercial and industrial pumps built to withstand the rigors of that class of service.

Fig. 19. Outfit No. 5035, complete as illustrated. 500 gallon per hour duplex power pump, with 35 gallon tank, pump-to-tank piping, etc.



## Fairbanks-Morse 500 Gallons per Hour Electric Home Water Systems

heavy duty  
duplex power pump  
quiet---no gears

This new 500 gallon F-M Shallow Well Water System is without question one of the most substantial and most efficient water systems ever put on the market. It is a real power unit, capable of delivering full 500 gallons per hour actual capacity against a maximum operating pressure of 40 pounds equivalent to 92 feet. It is admirably suited for any shallow well pumping where a capacity beyond the range of the 200 and 250 gallon pumps is desired.

Like the 250 gallon unit, the 500 gallon system is furnished in three different combinations—one with 35 or 70 gallon tank on a neat steel base as shown on the previous page, another where the pump is mounted on top of a 12 gallon tank and the third modification is the pump unit alone without tank for those installations where the storage tank is already installed.

### Duplex Power Pump

The pump is duplex design—two cylinders, two pistons, etc. It is compact, symmetrical in outline, has no unsightly projecting parts, extremely simple in construction and practically noiseless in operation. Furthermore it is double acting, which with the duplex design, means there are four suction and four discharge valves in the pump bonnet. Thus unusual valve area is provided for the water passages, a factor that contributes greatly to the quietness and efficiency of the pump.

### Quiet in Operation

The fundamental design of this water system assures a smooth operating pump. The

total absence of gears, both internal and external, together with the Flex-Mor "V" belt drive makes it an extremely quiet pump. In spite of its

Fig. 20. Outfit No. 5012, complete as illustrated—500 gallons per hour Shallow Well Electric Home Water System—with 12 gallon tank and decorative pressed steel base; automatic air volume control; motor protective relay mounted in box with conduit fitting, and many other features.



many desirable features and its distinctive design and in spite of the fact that this water system is complete with all control equipment, etc., it is offered at a price that is extremely low.

### Automatic, Self-Oiling

This system is completely automatic in operation—starting when the pressure in the tank drops to 20 pounds and stopping automatically when

the tank pressure is built up to 40 pounds.

The pump is self-oiling. No grease cups. The base of the power end serves as an oil reservoir. All that is necessary is to fill the oil reservoir and the pump lubrication takes care of itself, all parts being lubricated automatically.

The crankshaft is equipped with oil splashers which throw oil into auxiliary reservoirs, these being connected by lead-



ers to the main bearings. Surplus oil from the bearings drains back into the crankcase.

An abundant supply of oil is also thrown through another leader and the crossheads are kept flooded continually.

### Tanks

The tanks are carefully made and welded in our own factories. Galvanized both inside and out. Tested for 125 pounds pressure.

### Motor

The motor is an F-M repulsion type, single phase  $\frac{1}{2}$  H.P., rated on a continuous duty basis.

### Control

The automatic motor control switch, which starts and stops the pump is located on top of the motor. The base of the switch forms a conduit box containing a protective relay which prevents damage to the motor in case of an overload or low voltage condition on the line.

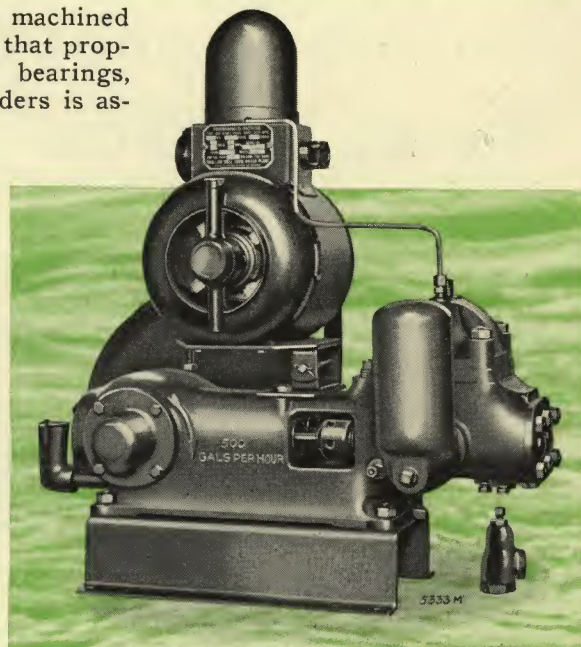
An air volume regulator is also furnished as standard equipment with all tank outfits. This automatically maintains the proper volume of air in the water tank; eliminates the possibility of water logged or air bound tanks; does away with excessive starting and stopping of the motor and prevents water hammer in the pipe lines.

### Pump Details

The water box and frame are

cast in one piece and machined at a single setting so that proper alignment of all bearings, crossheads and cylinders is assured.

Fig. 21. Outfit No. 500-S, complete as illustrated—500 gallons per hour Shallow Well Electric Pump Unit only. For the man who already has a pressure tank and desires to replace his pump.



The crankshaft is drop forged steel of liberal diameter. The relation of the cranks are such that in combination with the duplex feature of the pumps, a steady flow of water is assured.

Crankshaft bearings are bronze and removable. The crossheads are of brass and move in accurately bored guides.

The connecting rod is a brass forging. Crosshead pin bearings and crank pin bearings are of forged brass integral with the rod.

Piston rods of tobin bronze. Pistons are of the double cup leather type

The stuffing box and gland

are of brass. The gland cap is provided with a packing ring which acts as a drip arrester and prevents the water from working back along the piston rod to the crankcase.

The cylinders are of  $\frac{1}{8}$  inch seamless drawn brass tubing, securely pressed under pressure into the water box frame.

Lastly the pump is very accessible. Bearing end plates are removable and are of sufficient size to permit the withdrawal of the crankshaft should this be necessary. It is only necessary to remove the water box bonnet, end plate, and bearing plates and the entire working mechanism is accessible.

### 500 Gallons per Hour Systems

1. Duplex Double-Acting Pump--No Gears
2. Full  $\frac{1}{2}$ -H.P. Repulsion 60 Cycle Single Phase Motor
3. Motor Protective Relay
4. Fitted for Conduit Connection

5. No exposed wiring
6. Copper and brass piping between pump and tank
7. Air control with pressure gauge on all tank outfits
8. Capacity actual—not displacement

Outfit No.	DESCRIPTION	Approx. Floor Space, Inches	Height Overall, Inches	Suction Tap in Pump, Inches	Discharge Tap in Pump, Inches	Approx. Shipping Weight, Lbs.	Code Word	Price
500-S	Pump on Steel Base—No Tank	21x12 $\frac{3}{4}$	23	1 $\frac{1}{4}$	$\frac{3}{4}$	125	VGZJF	\$110.00
5012	Pump Atop 12 Gal. Galv. Tank	21x19	36 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{3}{4}$	175	VGZKG	122.00
5035	Pump with 35 " " "	23x33	35	1 $\frac{1}{4}$	$\frac{3}{4}$	205	VGZLH	132.50
5070	Pump with 70 " " "	23x33	65	1 $\frac{1}{4}$	$\frac{3}{4}$	240	VGZMI	141.00

**MOTOR AND DRIVE:**—Standard outfit includes 110-220 volt, 60 cycle, single phase motor. If a direct current or special cycle motor is needed it can be furnished in place of the standard motor at a small additional cost. See page 84. The drive is the Flex-Mor "V" belt; requiring no oil or belt dressing. It is quiet, positive in its grip, efficient. A convenient belt take-up is provided.



# FAIRBANKS-MORSE

## Electric Typhoon

### Water Systems

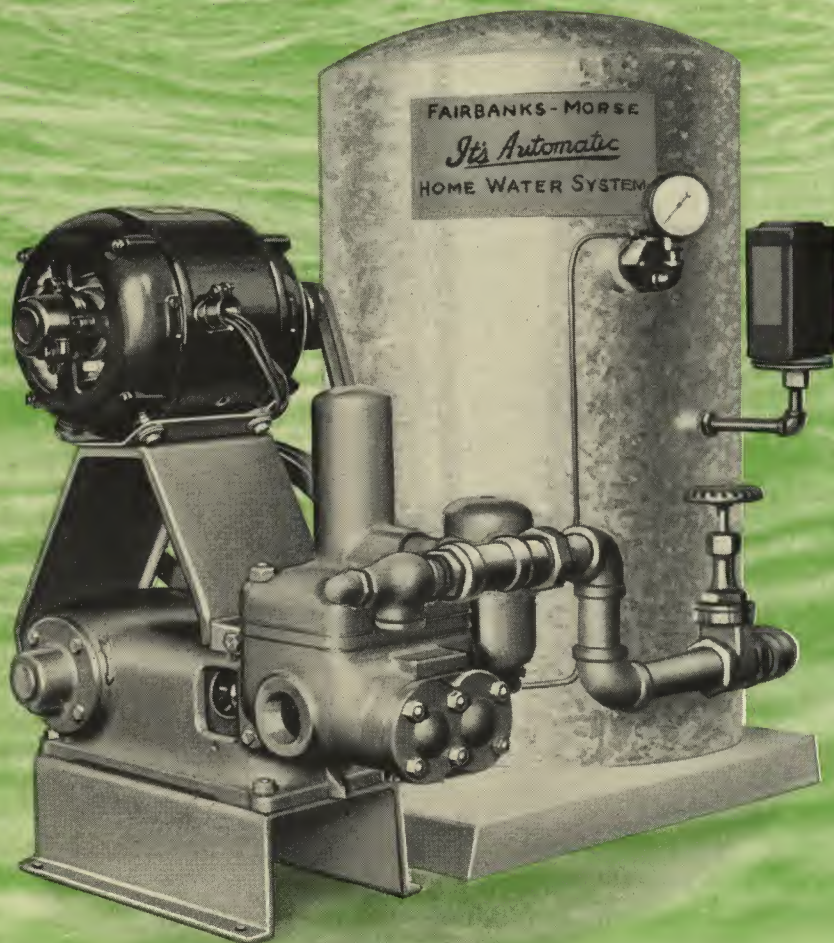


Fig. 24. Electric Typhoon Water System complete with pump, top mounted motor, tank, pipe and control equipment. Complete tank assemblies regularly listed with 600 and 1000 gallon per hour pumps. Units in larger sizes available if desired.

Fairbanks-Morse Electric Self-Oiling Typhoon Water Systems operate smoothly and efficiently. The absence of gears, internal and external, makes this pump unusually quiet in operation. Even in spite of the many desirable features and the attractive design of this line of water systems, they are offered at prices that are competitive with single cylinder gear pumps of cheaper construction.



# Fairbanks-Morse Electric Typhoon Water Systems

For general pumping where the lift is 22 feet or less and the total discharge head does not exceed 100 pounds pressure or 230 feet. Sizes 600 to 5000 gallons per hour.

As a supplement to their electric shallow well water systems of 200, 250 and 500 gallon capacities, designed to operate against discharge pressures up to 40 pounds; Fairbanks-Morse also build a complete line of larger pumps for shallow well service, known as the Self-Oiling Typhoon. These pumps are built in capacities from 600 to 5000 gallons per hour and for discharge pressures up to 100 lbs. which is equivalent to 230 feet.

These Self-Oiling Typhoon water systems are examples of what can be accomplished when the same engineering considerations employed in the manufacture of large pumping units are incorporated in pumps of the more popular capacities. In the Typhoon water systems you will find the principles of up-to-date pump design followed in such a way that the result is a marvel of simplicity. You will find construction details and engineering ideas that could not possibly be incorporated in a pump of this price class if it were not for the extraordinary skill of F-M designers and the unusual efficiency of F-M production.

For example, note the 600 gallon, which is the smallest size. Here we have, not a 300 gallon house pump speeded up to dou-

ble its capacity and to overtax its ability for the sake of meeting a printed specification, but a real 600 gallon pump designed from the ground up to deliver 600 gallons per hour and to withstand an operating pressure of 100 pounds. The larger sizes are just as conservatively rated.

## Duplex Design

The pumping unit of these water systems is of the duplex, double acting design. The complete absence of gears makes it an exceptionally quiet operating pump so that it can be installed anywhere without fear of annoyance.

These pumps are generally used for supplying water under pressure to large stock farms, country estates, or any other

self-oiling  
duplex

quiet---no gears

service where more than the ordinary amount of water is required or where a pump of more than the usual operating pressure is desired. They are used in factories, greenhouses, public buildings, etc.

For the sake of convenience the 600 gallon and 1000 gallon sizes as shown here, are assembled as a unit with tanks for pressure service. These outfits are *priced complete* as illustrated, with pump, motor, tank, control equipment and pump-to-tank pipe—in fact everything needed for the installation with the exception of the suction and discharge pipes.

These tank outfits are listed for operating pressures of 65 lbs. If desired they can be

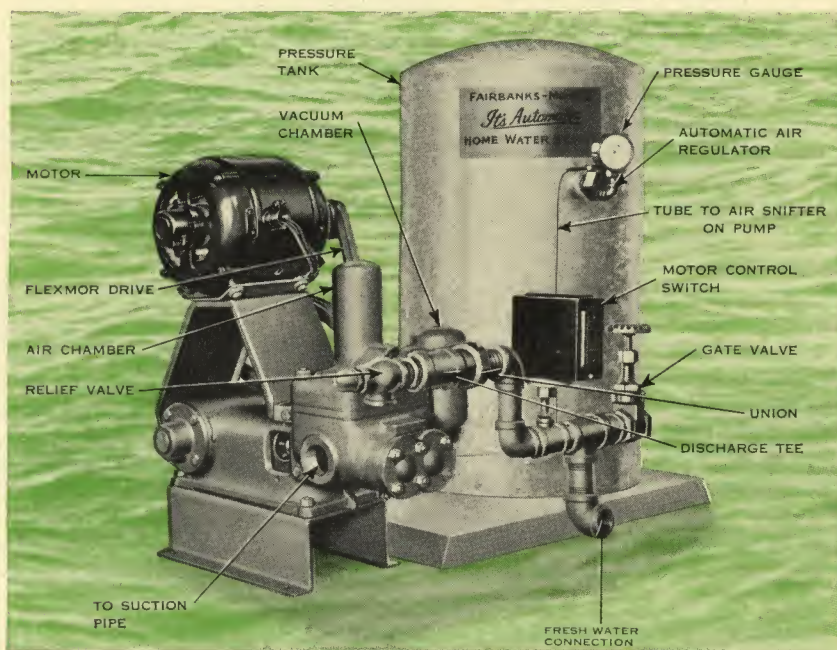


Fig. 25. Complete Electric Typhoon Water System equipped with fresh water attachment for delivering drinking water direct from the well.



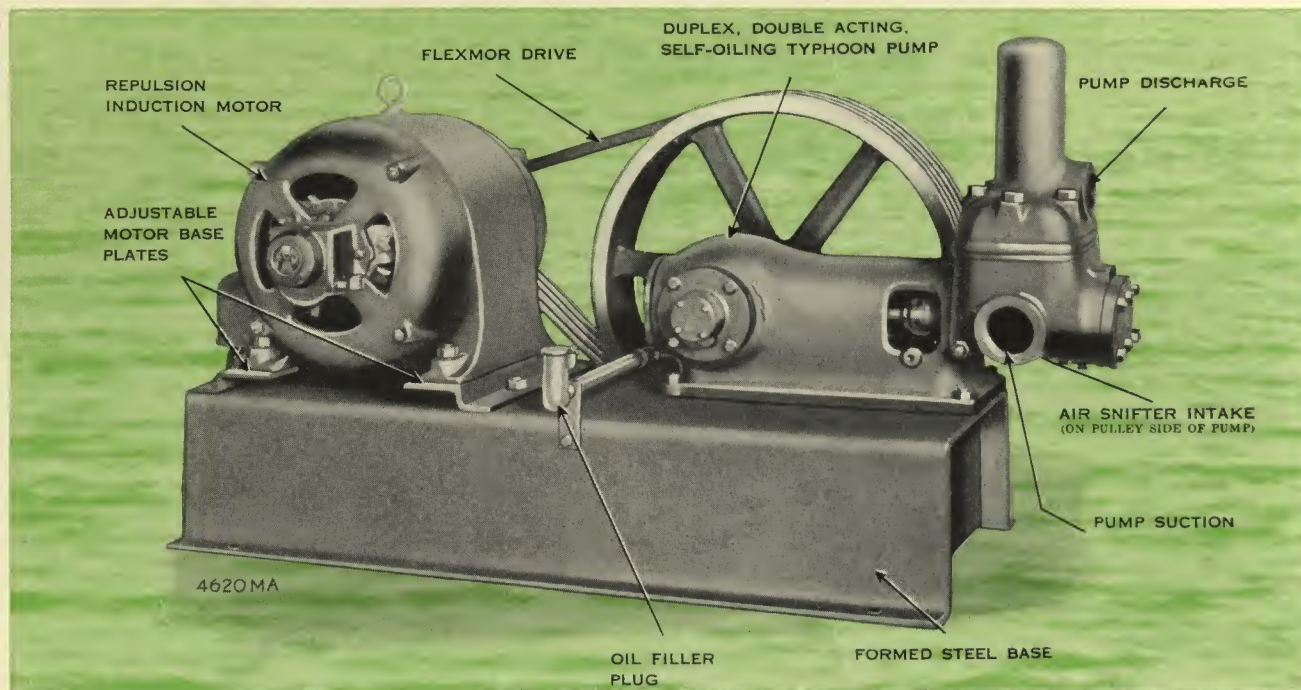


Fig. 26. In the case of the 2500 gallon and 5000 gallon pumps the motor and pump are mounted tandem on a neat steel base as shown above. Because of the larger motors required for the higher pressure, this is also the style of mounting used on the smaller sizes when furnished for 100 pounds pressure.

supplied on special order for 100 lbs. operating pressure.

### Pressure Tank

The tank furnished with the complete systems is electrically welded and built for an operating pressure of 75 pounds, being subjected in manufacture to a test pressure of 150 lbs. It is carefully galvanized inside and out. A pressure gauge is part of the tank equipment as well as an automatic air regulator which prevents the system from becoming either water-logged or air bound. An air chamber is regularly furnished with the pump. Relief valve, union, gate valve, nipples, pressure switch, etc., are all included in the regular pump-to-tank piping shown in the illustrations.

### Fresh Water Attachment

The outfits as illustrated in Figure 25 are identical in serv-

ice with those just described except the fresh water attachment is included. This attachment will permit of drawing water directly from the source of supply without passing through the storage tank. This feature is particularly desirable where a large storage tank is used. With tanks smaller than 220 gallon capacity the fresh water attachment rarely is necessary and it is not recommended.

### Motors

The motor used is of F-M make, designed for continuous, full load operation. It is an exceptionally high grade motor, conforming in every detail to the exacting standards which have established Fairbanks-Morse as leaders in the design and manufacture of electric power machinery.

### Flex-Mor Drive

The drive is the Flex-Mor "V" belt used extensively by

Fairbanks-Morse for heavy duty power transmission in municipal and industrial pumping and generating service. It is a clean, silent, positive drive requiring no lubrication.



Fig. 31. The motor mounting used on 600, 1000 and 1500 gallon sizes for 65 pounds pressure is illustrated above. A substantial steel bracket provides the support for the top mounted motor, making a neat and compactly assembled unit. A slot at the end of the bracket provides a convenient means for belt take-up.



## MOTOR-DRIVEN SELF-OILING TYPHOON PUMPS

Outfits Listed Below Include:

1. Silent, Duplex, Double Acting, Self-Oiling Typhoon Pump (no gears).
2. Silent Flex-Mor Drive (requires no oil).
3. Repulsion, 60-Cycle, Single Phase Motor.
4. Formed Steel Base (compact assembly).
5. Air Snifter Intake.

Outfit Number	Capacity (Actual—not Displacement)		Approx. Floor Space, Inches	Height Overall, Inches	Motor		Maximum Operating Pressure		Number Belts in Flex-Mor Drive	Approx. Shipping Weight, Lbs.	Code Word	Price
	Gals. per Hour	Gals. per Min.			H.P.	Type	Lbs.	Feet				
*6075-T	600	10.0	14 $\frac{3}{8}$ x22 $\frac{5}{8}$	23	$\frac{3}{4}$	SRB	65	150	2	200	VGEBS	\$138.00
6001-M	600	10.0	18 $\frac{1}{4}$ x36	18 $\frac{1}{4}$	1	SRB	100	230	2	260	VGECT	145.00
*1001-T	1000	16.6	15 $\frac{3}{8}$ x25 $\frac{1}{4}$	27	1	SRB	65	150	2	290	VGEGY	180.00
1002-M	1000	16.6	22 $\frac{3}{4}$ x39 $\frac{3}{4}$	20 $\frac{3}{4}$	2	SPB	100	230	4	380	VGEHZ	250.00
*1502-T	1500	25.0	17 $\frac{3}{8}$ x30 $\frac{1}{8}$	33 $\frac{1}{2}$	2	SPB	65	150	4	460	VGELC	285.00
1503-M	1500	25.0	24 x49 $\frac{1}{4}$	26	3	SPB	100	230	6	600	VGEMD	**320.00
2503-M	2500	41.5	28 x60 $\frac{3}{4}$	29 $\frac{1}{2}$	3	SPB	65	150	6	750	VGEPG	**355.00
2505-M	2500	41.5	28 x60 $\frac{3}{4}$	31 $\frac{1}{2}$	5	SPB	100	230	9	875	VGERI	†415.00
5005-M	5000	83.0	28 $\frac{1}{4}$ x62 $\frac{1}{2}$	33 $\frac{3}{4}$	5	SPB	65	150	9	995	VGEUL	†560.00
5075-M	5000	83.0	28 $\frac{1}{4}$ x62 $\frac{1}{2}$	35 $\frac{1}{2}$	7 $\frac{1}{2}$	Q	100	230	12	1030	VGEVM	†560.00

\*These outfits are standard with the motor mounted on top of the pump. When a motor other than the standard 60 cycle single phase is required, the motor is mounted tandem on an extended steel base which increases the list price of the pump unit \$10.00 beyond the regular addition for the special motor as given on page 84.

With the exception of the 7 $\frac{1}{2}$  H.P. motor (which is 3 phase) the above prices cover outfits with 110 or 220 volt, 60 cycle, single phase motors. If direct current or special cycle motors are required, see table on page 84 for additions to make for the motor as well as additions for the special starting equipment when the latter is necessary.

\*\*If the 3 H.P. single phase motor is used on 110 volts, a secondary starter should be used in addition to the standard pressure switch. See table on page 84. The starter is not necessary with the 3 H.P. motor in 220 or 440 volts.

†A secondary starter (in addition to the regular pressure switch) should be used with the motor in the case of all 5 H.P. and 7 $\frac{1}{2}$  table on H.P. ratings. See page 84 for prices.

**Pressure Control:**—Where motor is to be controlled automatically by means of pressure in the pneumatic tank, use the No. 9014 pressure switch (or the No. 9013) with secondary starter if the secondary starter is required.

**PUMPS FOR OPEN TANK SERVICE:**—There is no difference in the pump unit when used for open tank service. All that it is necessary to do is to operate with the air snifter valve closed when pumping into an open tank.

### Add for Drive Guard When Wanted

(Guard not furnished for top-mounted motor outfits)

	Approx. Shpg. Weight, Lbs.	Add to Price
600 G.P.H. Combinations...	10	\$5.50
1000 G.P.H. Combinations...	10	5.50
1500 G.P.H. Combinations...	15	6.75
2500 G.P.H. Combinations...	20	7.25
5000 G.P.H. Combinations...	25	7.75

## MOTOR-DRIVEN TYPHOON PUMP COMBINATIONS COMPLETE WITH TANK

These Outfits Include:

1. Silent, Duplex Double Acting Pump.
2. Repulsion Single Phase 60 Cycle Motor.
3. Formed Steel Base under pump.
4. Silent Flex-Mor Drive (requires no oil).
5. 35 or 70 Gal. Galvanized Tank (as selected).
6. And Piping Accessory Package consisting of: Automatic Air Control . . . Pressure Gauge . . . Motor Control Switch . . . Globe Valve . . . Relief Valve . . . Union . . . Tee . . . and necessary 1 $\frac{1}{4}$ " ells, nipples, etc. to complete the pump-to-tank connections as illustrated.

Item	600 GALS. PER HOUR (Actual Capacity—Not Displacement) Consisting of 600 gal. Pump with $\frac{3}{4}$ H.P. Single Phase Motor (Top Mounted) Maximum Operating Pressure, 65 Pounds				1000 GALS. PER HOUR (Actual Capacity—Not Displacement) Consisting of 1000 gal. Pump with 1 H.P. Single Phase Motor (Top Mounted) Maximum Operating Pressure, 65 Pounds			
	Outfit Number	Code Word	Approx. Shpg. Weight, Lbs.	Price	Outfit Number	Code Word	Approx. Shpg. Weight, Lbs.	Price
Pump-Motor Unit (Top Mounted)	6075-T	VGEBS	200	\$138.00	1001-T	VGEGY	290	\$180.00
Piping—Accessory Package.....	6801	VHBHC	45	26.00	6801	VHBHC	45	26.00
35 Gal. Galvanized Tank.....	5476	VHBAV	75	16.00	5476	VHBAV	75	16.00
Outfit Complete with 35 Gal. Tank	6075T-35	VGIBN	320	180.00	1001T-35	VHEFX	410	222.00
Outfit Complete with 70 Gal. Tank	6075T-70	VEICO	355	188.50	1001T-70	VGIPC	445	230.50

**LARGER SIZE TANKS:**—Larger size tanks can be substituted in place of the 35 and 70 gal. tanks listed above. See page 76 for prices on complete line of tanks.

**SPECIAL MOTORS:**—The standard outfit in these complete tank assemblies includes a 110-220 volt 60 cycle single phase motor, top mounted. When special motors are required there will be an additional charge for the motor (see page 84) and also an additional charge of \$10.00 list on the pump unit to cover the extended steel base and motor adapter plates necessary for tandem mounting. Only the outfit with standard motor is furnished top-mounted.

### Fresh Water Attachment

Outfit No.		Price
6833	For Either the 600 or 1000 G.P.H. Systems.....	\$5.00

### Line Protection

If automatic cut-out is wanted for overload and low-voltage protection of the motor, order protective cut-out No. 9020.

Outfit No.		Price
9020-B	Single Pole for Single Phase Motors	\$4.50
9020-A	Double Pole for Three Phase Motors	9.00

Always give motor H.P., voltage, cycles (if A.C.) and if possible, the motor amperes, when ordering the cut-out. The cut-out may be reset after tripping by pushing a button—no fuses or relays to replace.



# FAIRBANKS-MORSE

## "Z" Engine Driven Typhoon Water Systems

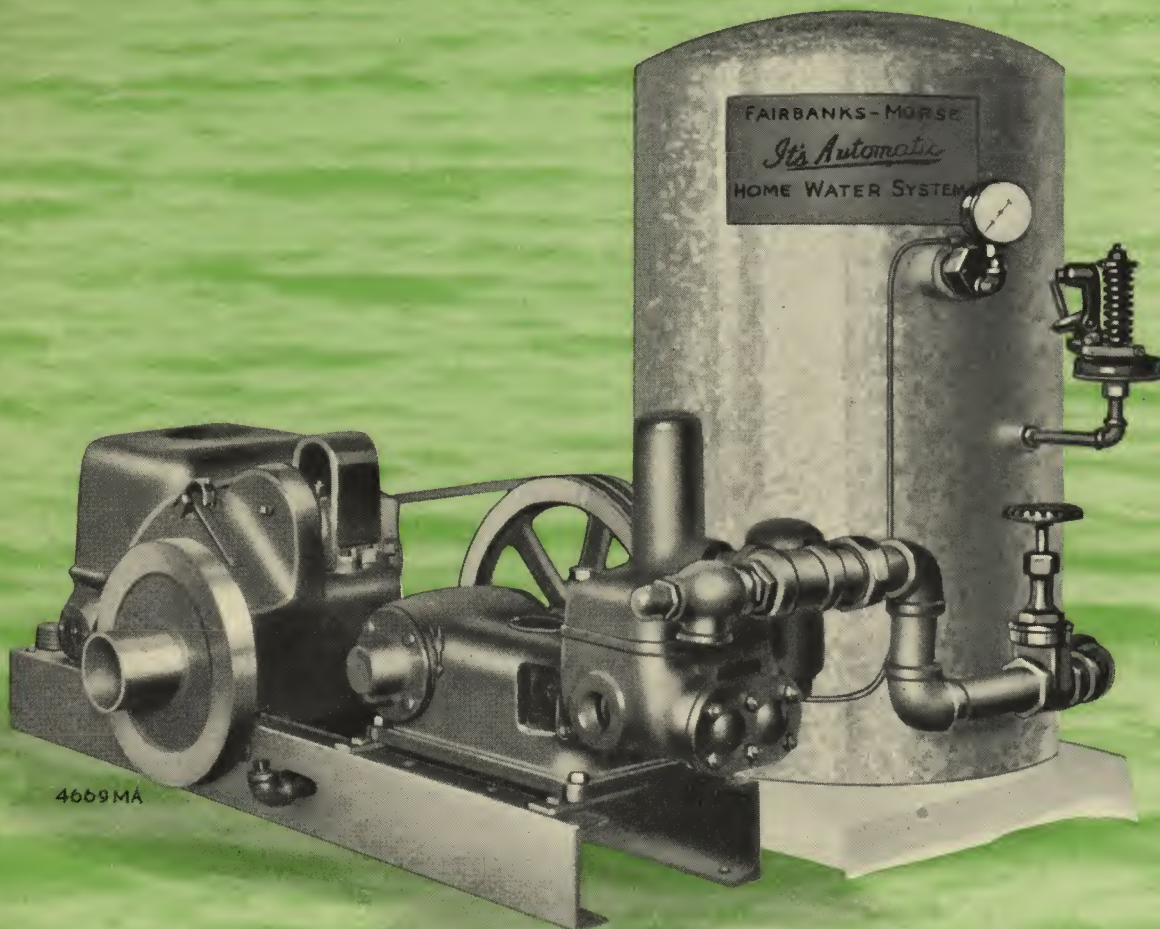


Fig. 27. The 600 and 1000 gallon per hour sizes are available as complete package units as shown above, including tank, piping and Flex-Mor drive.

Electricity is not necessary to enjoy the profits and conveniences of running water under pressure. The Fairbanks-Morse "Z" Engine Driven Typhoon Water Systems described here are for lifts of 22 feet or less and are for use where electricity is not available. Built complete by Fairbanks-Morse, satisfactory performance of the combination as a unit is assured. Built in five sizes—600 to 5000 gallons per hour.



# "Z" Engine Driven Typhoon Water Systems

▼ ▼ ▼  
self-oiling  
duplex  
complete  
▼ ▼ ▼

For general pumping service for lifts of 22 feet or less and the total discharge head does not exceed 100 pounds pressure or 230 feet. Five sizes—600, 1000, 1500, 2500 and 5000 gallons per hour.

date method of power transmission on the market. The complete combination is tested as a unit in the F-M factory before shipment, assuring a perfect operating assembly.

## Service

These units are widely used for supplying water under pressure for large stock farms, country estates, factories, greenhouses, irrigating purposes and any other service where a large amount of water is required and electric current is not available.

The 600 gallon and 1000 gallon sizes, the ones most commonly used for general pressure tank service, are offered complete with pump-to-tank piping, pressure tank and engine ignition grounding switch to stop the engine when the required pressure in the tank is reached.

▼ ▼ ▼  
The advantages of centralized responsibility in the purchase of a water system of this kind, both ends of which, engine and pump, are made by one manufacturer, are very apparent. In addition to getting a combination in which both the pump and the driver are particularly adapted for operation as a unit there is no shifting of responsibility in case either part of the equipment fails to measure up to the required standard of satisfaction.

Where electricity is not available these units will afford a very satisfactory and dependable means of supplying running water under pressure. The power unit is the famous F-M "Z" engine, known all over the world as one of the most dependable gasoline engines made. The pump is the popular F-M Self-Oiling Typhoon and the drive is the F-M Flex-Mor—the most approved and up-to-

## Pressure Tanks

The tanks regularly listed with the complete engine operated pressure tank systems are of electrically welded construction designed for 75 pounds working pressure and are subjected to a test pressure of 150 pounds per square inch before leaving the factory. Inasmuch as the operating pressure range for ordinary water system service, engine-operated, is 30 to 50 pounds the standard tank has a very liberal factor of safety.

The pump itself, however, is designed for a maximum of 100 pounds operating pressure and extra heavy tanks for 100 pounds working pressure (200 pounds test) can be furnished on special order where it is desired to operate the pump at this higher pressure.

Tanks can be furnished either black or galvanized finish. The

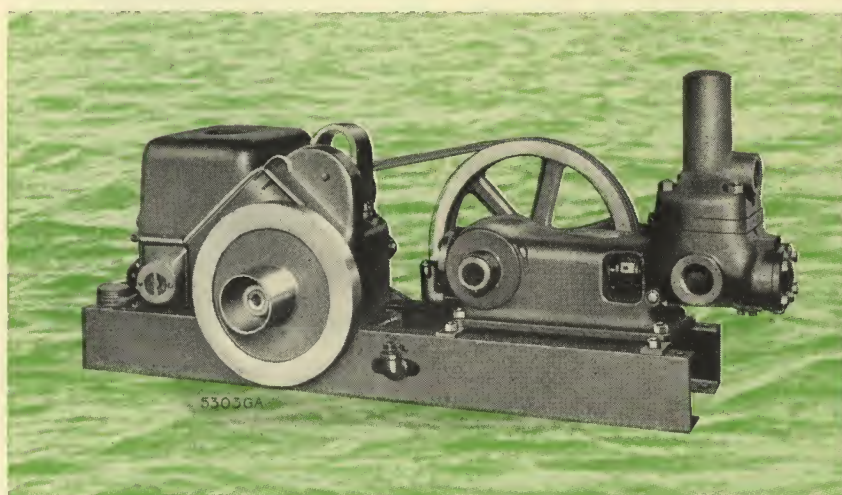


Fig. 28. The 1000 gallon Self-Oiling Typhoon pump driven by 1½ H.P. F-M Self-Oiling "Z" Engine.



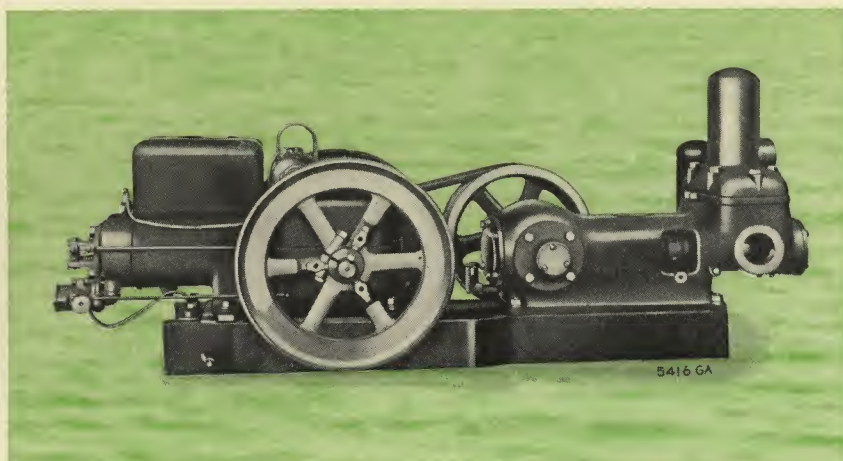


Fig. 29. The 2500 gallon Self-Oiling Typhoon pump driven by 3 H.P. F-M Self-Oiling "Z" Engine. The 5000 gallon pump is driven by the 5 H.P. "Z" Engine.

black tanks are painted with two coats of preservative paint; the galvanized tanks are galvanized inside and out.

### Automatic Air Control

The complete engine-operated pressure tank systems are provided with automatic air control. This device, which is mounted in the tank, is connected by means of a copper tube to the air snifter on the pump and by automatically closing or opening the air snifter line, according to the water level variations in the tank, the correct proportion of air for most efficient operation of the system is maintained. Thus the tank is prevented from becoming either water-logged or air bound. A pressure gauge is regularly furnished as a part of the standard accessories on the complete tank outfits.

### Automatic Stop

Being engine driven, the complete pressure tank systems will not start automatically, but the engine ignition switch located in the tank is connected to ground the ignition and stop the engine when the pressure in

the tank builds up to 50 pounds. All that it is necessary to do is to see there is oil and fuel in the engine, give it a turn and let it run. When the tank is pumped up to the proper pressure the engine will stop automatically.

### Easy Starting

The F-M "Z" engine used on the power end of these combinations has the reputation of being the easiest starting engine on the market. It has been a more or less general opinion in the past that a large storage

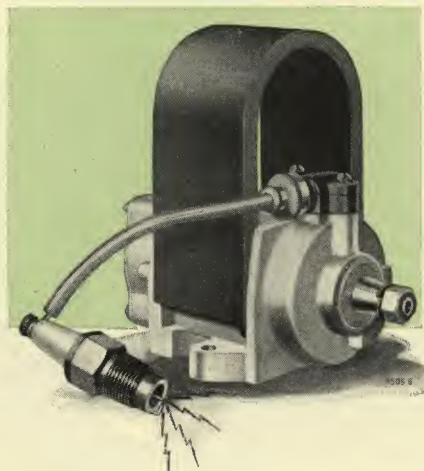


Fig. 30. The Type "R" Magneto insures easy starting of F-M engine driven Typhoon Water Systems.

tank is always necessary in connection with an engine operated system because of the difficulty in getting the engine in operation. This, however, does not apply to Fairbanks-Morse engine operated systems. You may use a tank as small as 220 gallons capacity if you desire to keep the cost at a minimum because the engine is not temperamental—it is always ready to start.

### High Tension Type "R" Magneto

Aside from the quality of workmanship in the engine itself the chief contributing factor to the easy starting feature is the Type "R" High Tension Rotary Magneto made by Fairbanks-Morse exclusively for the "Z" engine. This magento delivers a hot, fat spark necessary for easy starting. It also has a number of other unusual features that eliminate entirely the annoying troubles that have been experienced in the past with engine ignition.

For instance, it is sealed against dirt, dust and moisture. There is no necessity whatever for breaking the seals thereby destroying the moisture-proof enclosure. The matter of lubrication is taken care of in the internal design of the magneto.

There are no adjustments of any kind to make on the magneto such as the adjustment of points, bearings, etc. It is guaranteed to function properly. It



carries on its end plate a definite guaranty date of one year and if it fails to function at any time within that period it will be replaced free of charge with another magneto provided the seals are not broken.

### Self-Oiling Engine

Not only is the pump self-oiling but the engine likewise is of the self-oiling type. The crank case serves as an oil reservoir supplying oil to the bearings, the pistons, etc., whenever the engine is in operation. All

that is required to take care of the lubrication problem is to see that the crank cases of both the engine and the pump are properly supplied with oil. The magneto needs no attention whatever.

### The Pump

In the Self-Oiling Typhoon pump, which forms the pump end of the assembly, you will find principles of up-to-date pump design followed in such a way that the result is a marvel

of simplicity and harmony. You will find construction details and engineering ideas that could not possibly be incorporated in a pump of this price class were it not for the extraordinary skill of Fairbanks-Morse designers and the unusual efficiency of Fairbanks-Morse production methods.

### Duplex Design

The pump unit is of duplex design and double acting. Complete specifications follow.

## Prices--Engine Driven Typhoon Pump Combinations 600 TO 5000 G.P.H. CAPACITY—DISCHARGE PRESSURE UP TO 100 LBS.

FLEX-MOR DRIVE

PRICES INCLUDE

SUITABLE FOR LIFTS OF 22' OR LESS

Self-oiling Typhoon pump with well known Fairbanks-Morse "Z" engine and Flex-Mor drive, all mounted on an extra heavy channel iron base. F-M magneto ignition on engine for easy starting. Drive guard not included but can be furnished as an extra.  
FOR PRESSURE OR OPEN TANK SERVICE:—Air snifter valve furnished as regular equipment with all pumps. No special air intake valve required when the pumps are used for pressure tank service.

Equipment	Maximum Discharge Pressure		No. Belts in Drive	Floor Space Required	Height Overall	Outfit No.	Code Word	Approx. Shipping Weight, Lbs.	Price
	Lbs.	Feet							
1½ H.P. "Z" Engine and 600 G.P.H. Pump.	100	230	2	48" x 18"	17½"	6757	VHDL E	300	\$160.00
1½ H.P. "Z" Engine and 1000 G.P.H. Pump.	100	230	2	46½" x 17¾"	19½"	6724	VHDBU	355	180.00
3 H.P. "Z" Engine and 1500 G.P.H. Pump.	100	230	6	61½" x 25"	22½"	6773	VHDSL	565	278.00
3 H.P. "Z" Engine and 2500 G.P.H. Pump.	65	150	6	62" x 24½"	25¼"	6774	VHDTM	655	318.00
5 H.P. "Z" Engine and 2500 G.P.H. Pump.	100	230	9	69½" x 32¼"	25¼"	6775	VHDUN	855	371.50
5 H.P. "Z" Engine and 5000 G.P.H. Pump.	65	150	9	80¾" x 31½"	36½"	6776	VHDVO	1040	483.50
7½ H.P. "Z" Engine and 5000 G.P.H. Pump.	100	230	12	86" x 35"	38½"	7098	VHDRK	1500	575.00
			1½ H.P. Units	3 H.P. Units	5 H.P. Units	7½ H.P. Unit			
If Drive Guard is wanted on any of above, add.....			\$6.50	\$6.50	\$7.00	\$14.50			

### PRICES ON 1½ H.P. COMPLETE ENGINE DRIVEN WATER SYSTEMS WITH 220 GAL. TANK

ITEM	600 Gals. per Hour (Actual Capacity—Not Displacement)				1000 Gals. per Hour (Actual Capacity—Not Displacement)			
	Outfit No.	Approx. Shpg. Wt. Lbs.	Code Word	Price	Outfit No.	Approx. Shpg. Wt. Lbs.	Code Word	Price
Pump Unit (From Table Above).....	6757	300	VHDL E	\$160.00	6724	355	VHDBU	\$180.00
*Piping and Accessory Package.....	6809	40	VHBID	26.50	6809	40	VHBID	26.50
220 Gal. Black Tank.....	6887	410	VHBJE	38.00	6887	410	VHBJE	38.00
System complete with 220 Gal. Black Tank	6757-220B	750	VHF XO	224.50	6724-220B	805	VHGJZ	244.50
System complete with 220 Gal. Galv. Tank	6757-220G	780	VHFYP	231.50	6724-220G	835	VHGKV	251.50

If larger tanks are required, or extra heavy tanks to withstand 100 lbs. working pressure (200 lbs. test), see page 76 in accessory section for prices.

\*Piping and Accessory Package:—Consists of air control, pressure gauge, mag. grounding switch, globe valve, relief valve, necessary union, ells, nipples to complete pump-to-pump piping as illustrated.



# General Design of F-M Self-Oiling Typhoon Pumps

In general, the design of the Duplex Self-Oiling Typhoon is a distinct departure from the old style of pump ordinarily offered for this class of service. It is one of the most popular pumps ever made. All working parts are completely enclosed, fully protected from dirt and injury; at the same time all parts are easy of access.

The compact symmetrical design of the pump is also very pleasing to the eye. There are no unsightly projecting parts. Its stream line contour, its substantial base, in fact its entire appearance reflect externally the smooth working mechanism contained inside the frame. The construction is simple. There are no intricate parts which require frequent adjustment. It is practically noiseless in operation, and it is recommended for those installations where quietness is essential.

The detailed specifications following cover a pump fitted for cold fresh water. The pump may be specially fitted for hot water, brine, oil and other liquids.

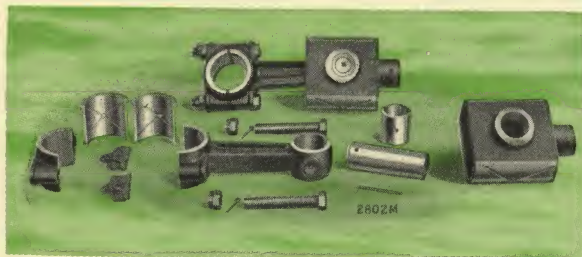


Fig. 33. Connecting rod and cross head details of 5000 gallon per hour Typhoon pump.

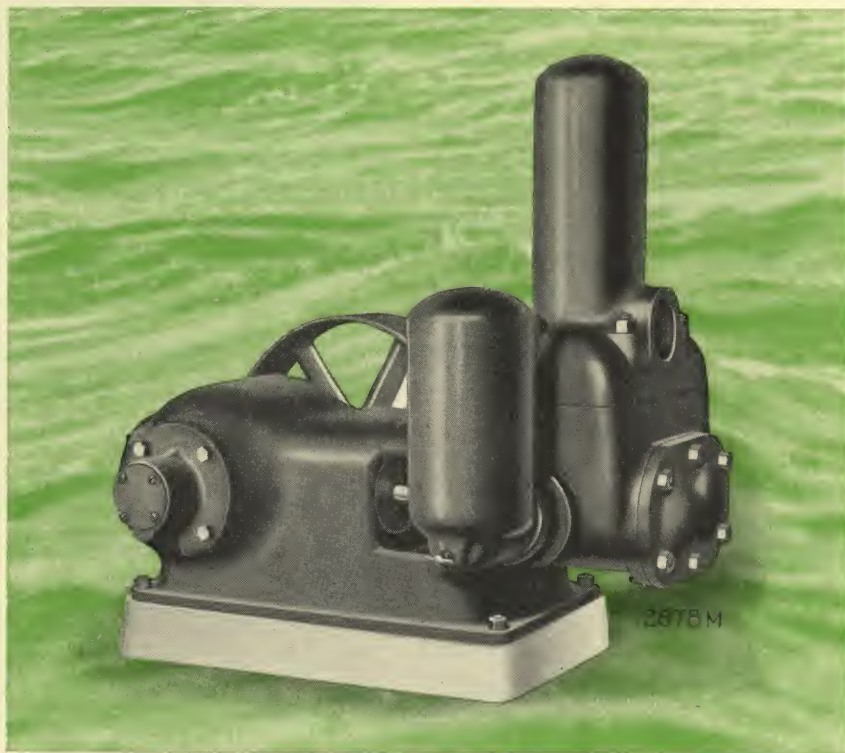


Fig. 32. The Duplex, Gearless, Self-Oiling Typhoon Power Pump shown below is one of the most popular shallow well pumps on the market.

## Duplex Construction

The Self-Oiling Typhoon is a duplex pump, even the 600 gallon size is of the duplex design — two cylinders, two pistons, etc. Furthermore the pump is double acting, which, with the duplex design, means

there are four suction and four discharge valves in the pump bonnet (the larger sizes have eight). Thus unusual valve area is provided for the water passages, a factor that contributes greatly to the quietness and efficiency of the pump.

## Quiet In Operation

The fundamental design of the Self-Oiling Typhoon assures a smooth operating pump. The total absence of gears, internal and external, makes it an extremely quiet pump. In spite of its many desirable features



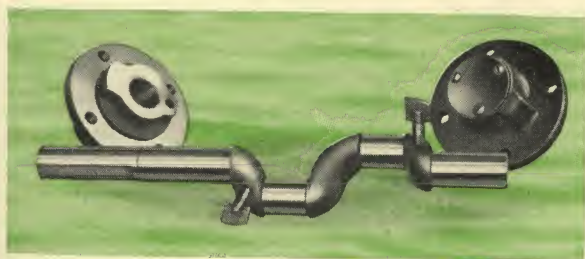
and distinctive design it is offered at a price that is competitive with the ordinary single cylinder gear pump of much cheaper construction.

## Lubrication

The pump is self-oiling. There are no grease cups to fill. The base of the power end serves as an oil reservoir. All that is necessary is to fill the oil reservoir and the oiling problem takes care of itself, all parts being lubricated automatically.

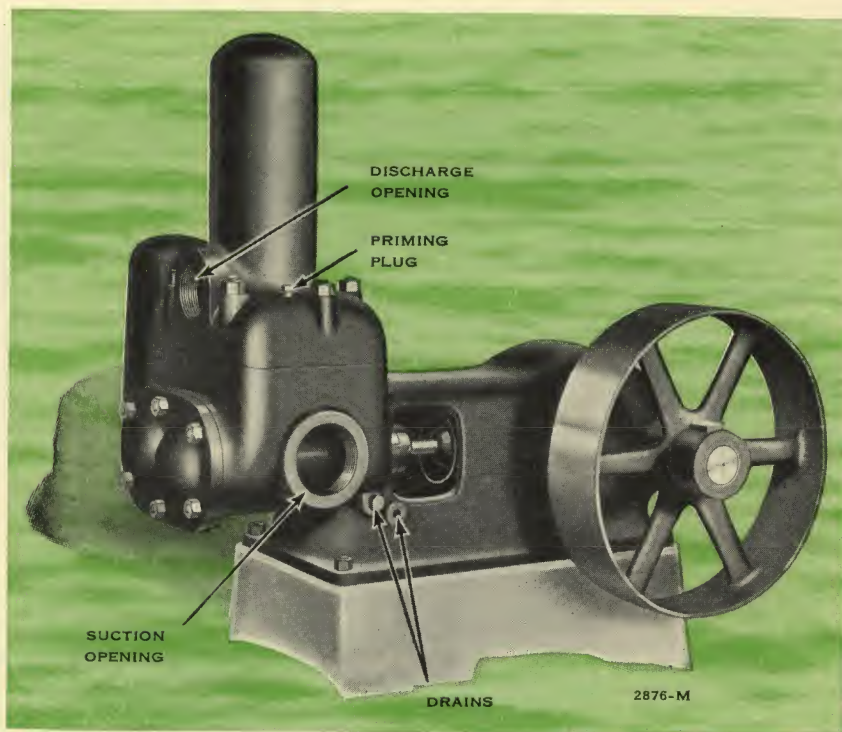
The crank shaft is equipped with oil splashers by means of which the oil is thrown into auxiliary reservoirs which are connected by means of leaders to the main bearings. The surplus oil from the bearings drains back into the crank case.

An abundant supply of oil is also thrown through another leader and the crossheads are kept continually flooded. This improved system of lubrication contributes greatly to the life of these important working parts of the power end.



## Water Box and Frame

The water box and frame are cast in one piece and machined at a single setting so that proper alignment of the bearings, crossheads and cylinders is assured.



## Drop Forged Crank Shaft

The crank shaft is a drop forging of liberal diameter, with ground journals and crank pins to give a high grade bearing surface. The relation of the cranks are such that in combination

Fig. 34. The belted Typhoon pump as shown above is for those cases where the customer already has his own power.

Fig. 35. The crankshaft is drop forged.

with the duplex feature of the pumps, a steady flow of water is assured.

## Bearings And Bearing Plates

The crank shaft bearings are of all bronze and are removable.

The bearing end plates, which are also removable are of sufficient size to permit the withdrawal of the crank shaft should this ever be necessary.

## Cross Heads

The cross heads are of cast iron in all cases with the exception of the 600 and 1000 gallon pumps. In these sizes they are of brass. All cross heads are of liberal diameter and move in accurately bored guides.

## Connecting Rods

On the 600 gallon pump, the connecting rod is a brass forg-





Fig. 36. Piston details of 5000 gallon per hour Typhoon pump.

ing. Crosshead pin bearings and crank pin bearings are of forged brass integral with the rod. On larger pumps, the rods are of drop forged steel, the cross head pin bearings are of bronze

separators are used on the 1500, 2500 and 5000 gallon sizes; brass separators on the 600 and 1000 gallon sizes. The separator acts as a reinforcement of the cup leathers and prevents



Fig. 37. Discharge valve plate showing the eight discharge valves furnished on all except the 600 and 1000 gallon size pumps. The two latter sizes have four.

and the crank pin bearings are of high grade babbitt, integral with the rod on the 1000, 1500, and 2500 gallon pumps; removable and renewable on the 5000 gallon size.

### Pistons and Piston Rods

Piston rods of tobin bronze. Pistons are of double cup leather type with anti-friction bearing metal separator. Babbitt

scoring of the cylinder liner if leathers are permitted to wear to point where separator rubs.

### Stuffing Box

The stuffing box and gland are of brass. The gland cap is provided with a packing ring which acts as a drip arrester, and prevents the water from working back along the piston rod to the crankcase.

### Cylinders and Valves

The cylinders are of  $\frac{1}{8}$ " seamless drawn brass tubing, securely pressed under pressure into the water box frame.

There are four suction valves and four discharge valves on the 600 and 1000 gallon pumps. The larger sizes have eight. The valves are of soft rubber, seating on bronze seats. A coiled spring on the valve stem holds the valve in place and imparts the necessary quick action to its operation.

### Self-Priming

The discharge valve plate has four bleeder holes, one for each displacement chamber. Any head on the discharge side will force water through the bleeder holes, flooding the suction valves, thereby making the pump self-priming.

The pump has three priming openings—two back of the bonnet and one in the bonnet, through which pump may be primed when first put in operation.

### Air Snifter

An air snifter valve to prevent water logging in pressure tank systems is part of the regular equipment on all pumps. When the pump is used for open tank pumping all that it is necessary to do is to close the snifter valve.

DETAIL SPECIFICATION DATA—SELF-OILING TYPHOON PUMPS

Gallons Per Hour	Number of Cylinders	Bore and Stroke, Inches	Suction, Inches	Discharge, Inches	R.P.M.	H.P. Required at 100 Lbs. Pressure	Pulley Shaft		
							Diam., Inches	Projection Inches	Key Inches
600	2	$1\frac{1}{4} \times 1\frac{5}{8}$	$1\frac{1}{4}$	1	350	1.0	$\frac{13}{16}$	2	$\frac{3}{8} \times \frac{1}{4} \times 1\frac{3}{4}$
1000	2	$1\frac{5}{8} \times 1\frac{7}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	270	1.33	$1\frac{15}{16}$	$2\frac{3}{4}$	$\frac{3}{8} \times \frac{1}{4} \times 1\frac{3}{4}$
1500	2	$2 \times 2\frac{1}{8}$	2	$1\frac{1}{2}$	230	2.00	$1\frac{1}{8}$	$3\frac{1}{2}$	$\frac{3}{8} \times \frac{1}{4} \times 2\frac{1}{2}$
2500	2	$2\frac{1}{2} \times 2\frac{1}{2}$	$2\frac{1}{2}$	2	215	3.33	$1\frac{5}{16}$	4	$1\frac{1}{2} \times \frac{3}{8} \times 3$
5000	2	$3\frac{1}{2} \times 2\frac{1}{2}$	3	$2\frac{1}{2}$	215	6.66	$1\frac{3}{4}$	$4\frac{1}{4}$	$1\frac{1}{2} \times \frac{3}{8} \times 3\frac{1}{4}$



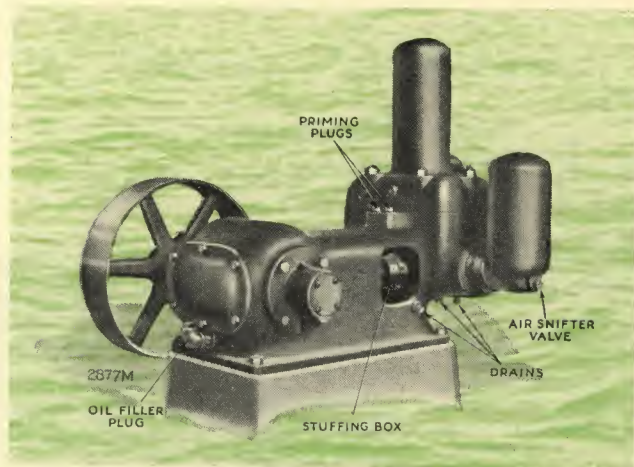


Fig. 38. Self-oiling Typhoon pump equipped with tight flat belt pulley.

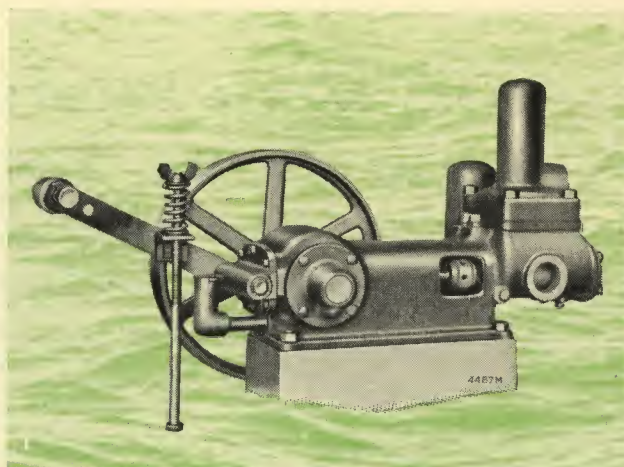


Fig. 39. Pump equipped with belt tightening idler attachment, furnished at slight extra cost.

## Prices of Self-Oiling Typhoon Pumps for Belted Service

100 Pounds Pressure or 230 Feet Elevation

Actual Capacity		Displacement		Bore and Stroke, Inches	Suction, Inches	Dischg. Inches	R.P.M.	H.P. Required at 100 Pound Pressure	Standard Pulley Size, Inches	Pump only, with Standard Pulley				Add for Belt Tightening Idler
Gals. per Hr.	Gals. per Min.	Gals. per Hr.	Gals. per Min.							Shpg. Weight, Lbs.	Outfit No.	Code Word	Price	
600	10.0	700	11.7	1 1/4x1 5/8	1 1/4	1	350	1.0	12x2 1/4	78	6758	WOFYV	\$60.00	8.50
*600	10.0	700	11.7	1 1/4x1 5/8	1 1/4	1	350	1.0	12x2 1/4	90	*6759	WOFZW	63.75	8.50
1000	16.6	1060	17.8	1 5/8x1 7/8	1 1/2	1 1/4	270	1.33	12x2 3/4	125	4337	WOGAV	80.00	12.35
1500	25.0	1545	26.0	2 x2 1/8	2	1 1/2	230	2.00	14x3 1/4	206	4338	WOGBW	105.00	12.35
2500	41.5	2600	43.5	2 1/2x2 1/2	2 1/2	2	215	3.33	16x4 1/4	306	4339	WOGCX	140.00	15.20
5000	83.0	5250	87.5	3 1/2x2 1/2	3	2 1/2	215	6.66	21x5 1/2	525	4340	WOGDY	250.00	15.20

\*This outfit covers the 600 gallon pump on pressed steel base.

For Pressure Tank or Open Tank Service:—Air snifter valve furnished as regular equipment with all pumps. No special air intake valve required when the pumps are used for pressure tank service.

### Overall Dimensions

	600 G.P.H.	1000 G.P.H.	1500 G.P.H.	2500 G.P.H.	5000 G.P.H.
Length, Overall.....	21 1/2"	22 7/8"	2'-2 1/2"	2'-7"	3'-0 5/8"
Width, Overall.....	10 7/8"	13 3/16"	15 3/8"	19 1/8"	2'-0 11/16"
*Height, Overall.....	12 7/8"	14 13/16"	17 13/16"	20 15/16"	2'-2 15/16"
Distance Std. Pulley extends below base line.	3"	2 1/2"	2 3/4"	3"	4 1/2"

\*Note:—This is the height from the pump base line to the top of the pump. The pulley extends somewhat below the base line.

## Pumps for Special Service

Self-Oiling Typhoon pumps can be fitted for handling hot water, oil or salt water on special order at the following prices: The special fittings required in a case of this kind will not be furnished for installation on pumps in the field. The pump complete must be ordered of the factory.

Size Pump	Outfit No.	Shipping Weight, Pounds	Code Word	Price
600 G.P.H.	6761	78	VHCDX	\$68.50
1000 G.P.H.	5672	125	VHCEY	95.00
1500 G.P.H.	5673	206	VHCFZ	125.00
2500 G.P.H.	5674	306	VHCGA	161.00
5000 G.P.H.	5675	525	VHCHB	285.00

## Special Pulleys for Typhoon Pumps

When pump pulleys larger than standard are required, they can be furnished at additional prices in the sizes listed below.

	Size Pulley	Add to Price of Standard Pump Above
For 1000 gallon pump	16x2 3/4"	\$3.70
For 1500 gallon pump	21x3 1/4"	4.20
For 2500 gallon pump	26x4 1/4"	7.75
For 5000 gallon pump	30x5 1/2"	7.75



# Fairbanks-Morse Standard Automatic Electric Sump Pump

**Cadmium Plated—Non Rusting  
With Clutch Type Motor And Overload Relay**

▼ ▼ ▼  
**quiet  
durable  
economical**  
▼ ▼ ▼

The Fairbanks-Morse standard automatic sump pump here described is a leader in the field of dependable, inexpensive high-grade pumps for general sump service. It may be used for pumping water out of basements, railroad track scale pits, ditches, excavations, low water spots or any other places where protection is desired against seepage and flood waters.

It is completely automatic in operation—starts without any attention whenever necessary and continues pumping until the pit or sub-floor drainage system is completely pumped out. Once installed in the pit it affords dependable protection—day and night—against the destructive forces of seepage and flood waters.

## Simple, Practical Design

The pump is of the centrifugal type with semi-open type impeller. The impeller, shell, cover, motor bracket, standard and pump base are of cast iron, *cadmium plated, non-rusting*.

## Impeller Shaft

The impeller shaft is of stainless steel, non-rusting, and is supported at the top by a special ball bearing, requiring little attention in the way of lubrication. The under-water bearing requires no lubrication whatever.

## Motor

The motor regularly furnished as standard is of the clutch type,

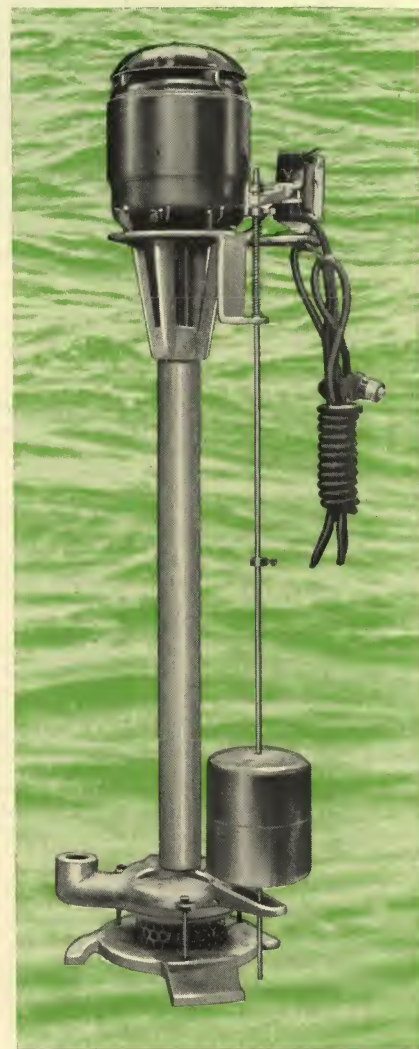
$\frac{1}{4}$  H.P., 1750 R.P.M., 60 cycle single phase 110 volts with thrust bearing for vertical operation. A repulsion induction motor or a motor for operation on a direct current or special cycle circuit can be substituted when necessary at a small additional cost.

## Accessories

The motor is provided with a protective cutout to guard against burn-out due to overload or low line voltage. The motor control switch and cutout are built in the same box. A heavy copper float on the switch actuating rod rises and falls with the water level in the sump, and controls the starting and stopping of the motor. Ten feet of flexible rubber covered moisture-proof wire with moulded rubber imbedded plug furnished as standard. Plugs into any light socket. Motor to switch connection fully enclosed — no exposed wiring.

## Sump

Sump should not be over two feet deep, using tile of desired size, putting a floor at the bottom. A circular screen at the base of the pump prevents heavy foreign matter from reaching the pump inlet. A protective sump cover to fit standard sewer crocks will be supplied at nominal cost.



**Price, Capacities, Etc., Fairbanks-Morse Standard Sump Pump**

Size No.	Pipe Connections Inches	Sump Depth, Feet	Height of Pump		Approximate Capacity, Gallons per Hour Against Discharge Head of					Size Motor H.P.	Code Word	Approx. Shipping Weight, Lbs.	Price
			Foot	Inches	5 Foot	10 Foot	15 Foot	20 Foot	22 Foot				
1-A	1	2	3	4	2520	2100	1310	780	420	$\frac{1}{4}$	VITAD	68	\$59.50

**Sump Cover:**—Pump will enter a 15" inside diameter pit. Sump covers made of steel plate can be furnished in either 17" or 18" diameters at a list price of \$10.00 each.

**Special Motors:**—Standard motor is a 110 volt 60 cycle single phase clutch type. Motors for operation on other circuits can be supplied at the following increase in list price:—

For 60 cycle Repulsion Induction Motor or 32 or 110 volt direct current.....	add \$ 6.50 list
For 50 cycle Repulsion Motor.....	add 8.00 list
For 25 or 30 cycle Repulsion Motor.....	add 15.00 list

Capacity and discharge head is slightly reduced when pump is equipped with 50 or 25 cycle motor.



# All Bronze Automatic Electric Sump Pump

Made In 5 Sizes---For 2 Foot, 3 Foot, 4 Foot,  
6½ Foot and 8½ Foot Pits

The sump pump here illustrated is recommended where an exceptionally high grade pump is desired for pumping from pits deeper than the 2 foot depth for which the Fairbanks-Morse standard sump pump is designed.

The pump is made in 5 different sizes for 2 foot, 3 foot, 4 foot, 6½ and 8½ foot pits.

## Motor

The motor is a ¼ H.P. 110 volt 60 cycle 1750 R.P.M. repulsion induction type equipped with ball thrust bearing for vertical operation. The motor control switch furnished is of the mercury type, especially adapted for float operation. Fully armored, insulated and moisture proof. A circuit breaker to protect motor against overheating and possible burn-out is furnished as regular equipment.

## Construction Details

Broad full brass base assures stability. Large brass strainer of ample area prevents heavy foreign matter from entering pump. Impeller is of machined brass. Rust proof brass supporting column assures perfect alignment of bearings as well as rigidity of entire unit and prevents foreign matter from winding up on impeller shaft. All bearings that require lubrication are furnished with grease cups.

The impeller shaft is of tobin bronze, supported at the top by a special ball bearing. The motor is connected to the impeller shaft by means of a flexible coupling.

## Float Control

Extra heavy leak proof copper float that slides freely on supporting column actuates the rod that opens and closes the motor control switch. Pump operates only when there is water to discharge.

## Sump Covers

Sump cover to fit standard sewer crocks supplied at nominal cost. The number 1 size cover fits the inside bell of a standard 18" sewer crock or over the top of a 15" sewer crock. Additional outer rings are furnished with covers to be used with 21 inch, 22 and 24 inch crocks.

Cover No.	Outside Dia.	Shipping Weight	List Price
1	19¾"	28-lbs.	\$10.00
2	24"	47-lbs.	13.00
3	27½"	58-lbs.	16.00



## Special Motors

The following current characteristics can be supplied at no additional charge:

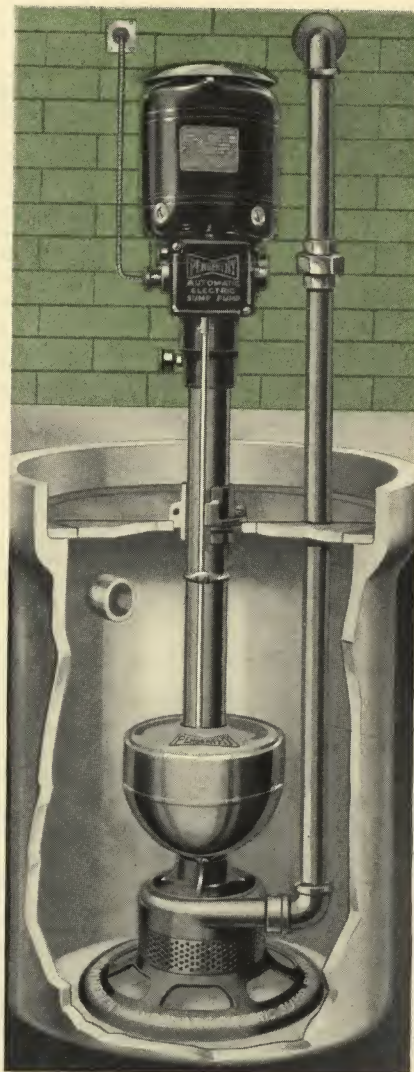
Alternating current 110 volts 50 cycles. 220 volts 60 or 50 cycles.

Add \$5.50 to list price for the following current characteristics:

Alternating current 110 volts 25 or 30 cycles. 220 volts 25 or 30 cycles.

Direct current—32, 110, 220 or 250 volts.

constructed of  
copper and bronze  
throughout



## List Prices, Sizes, Pipe Connections, Capacities, Etc.

Size No.	Pipe Connections, Inches	Sump Depth, Feet	Height of Pump		*Approximate Capacity Gallons per Hour Against Discharge Head of						Size Motor H.P.	Code Word	Weight Boxed Lbs.	List Price F.O.B. Detroit
			Foot	Inches	1 Foot	5 Foot	10 Foot	15 Foot	20 Foot	22 Foot				
1K	1¼	2	3	7¼	3600	3200	2600	1900	1000	600	¼	VITGK	102	\$69.50
2K	1¼	3	4	7¼	3600	3200	2600	1900	1000	600	¼	VITHL	115	91.50
3K	1¼	4	5	6	3600	3200	2600	1900	1000	600	¼	VITIM	128	107.00
4K	1¼	6½	7	11	3600	3200	2600	1900	1000	600	¼	VITJN	149	134.00
5K	1¼	8½	9	10	3600	3200	2600	1900	1000	600	¼	VITKO	195	161.00

\*To determine total discharge head, measure vertical distance, or elevation in feet from bottom of sump to highest point in discharge line, and add one-foot for each 30 feet of horizontal pipe and one-third foot for each elbow. Above table applies to 60 cycles A. C. and D. C. only. Capacity and discharge head is slightly reduced when pump is equipped with 50 or 25 cycle motor.



# When to use a Deep Well Pump

If the vertical distance from the bottom of the pump to the water level is more than 22 feet, a *deep well pumping unit must be used*.

This unit consists of a power head, a well cylinder, which is suspended in the well by means of a drop pipe, and a pump rod which connects the piston rod of the power head to the plunger of the well cylinder.

When the system is in operation, the water in the cylinder is forced up to the surface through the drop pipe and then into the storage tank. From the storage tank it is forced through the house pipes and to the fixtures just as in a shallow well system—by the pressure of the air in the tank in the case of a pneumatic system or by means of the gravity head in the case of an overhead tank system.

The important difference between a shallow well pump and a deep well pump is that the former relies entirely upon suction to draw the water to the surface. The deep well pump on the other hand, raises the water by means of a cylinder submerged in the well, the cylinder being operated by a pump rod from the pump. Because of its principle of operation, therefore, the deep well pump *must always be installed directly over the well*.

## Three Types of Wells

Deep wells are primarily of three types: 1. Driven; 2. Drilled or cased; 3. Open or dug.

In the driven well a point is attached to the well pipe and the well pipe is then driven down until it reaches the water bearing stratum. These wells are usually of small diameter—2 inches or even less. The well pipe serves both as casing and drop pipe. Ordinarily a driven well has a depth of 50 feet or less, as it is difficult to drive points deeper than this.

The drilled or cased well is by far the most common of the deep wells. Drilled wells sometimes go down to a depth of several hundred feet and run from 3 or 4 inches in diameter to a foot or even more. The well is cased as the drilling proceeds, although sometimes when the drilling is done through rock strata the casing is omitted. The drop pipe, with cylinder attached, is lowered in the casing until the cylinder is submerged in water.

The open or dug well is seldom made nowadays because of the difficulty and expense involved in digging and bricking. A dug well will hardly ever go below forty or fifty feet. In this well the drop pipe with cylinder attached is lowered until the cylinder is submerged

Fig. 50. Unlike the shallow well pump which can be placed in any convenient location within a reasonable distance from the source of supply, the deep well pump head must be installed directly over the well.





in water just as is the case of the drilled well.

### The Eureka Cylinder

The Eureka cylinder is quite commonly used in driven wells because of the small diameter of this type of well. It differs from the ordinary cylinder in that its method of installation eliminates the necessity of an external coupling for well pipe and consequently a cylinder larger in diameter can be used than would be possible if a cylinder with external coupling had to go in a well of this small diameter.

The Eureka cylinder is set in place, after the well point is driven, by means of seating tool shown in the illustration on this page. This seating tool is attached to the pump rod, the tool is then inserted in the cylinder and the cylinder crowded down the well pipe to its proper position below the water level. The dog spring coupling holds firmly to the inside walls of the pipe while the cylinder proper is revolved clockwise by the seating tool. As it screws down on the coupling, it expands the rubber packing between the cylinder and coupling, locking both securely in the pipe. The seating tool can then be withdrawn, and removed from pump rod. The foot valve is then screwed into the plunger, and the latter onto the pump rod and both valve and plunger

lowered in place and seated in the cylinder. The pump rod may then be rotated counter clockwise so as to unscrew the

plunger from the foot valve, leaving the latter firmly seated in the cylinder and the cylinder is ready for operation.

## How to figure a Deep Well Water System Job

Fairbanks-Morse sales information and prices are figured out in such a way as to make it easy not only to determine the right size and style of pump for the job at hand, but also to arrive at the correct price with the least effort.

All that is necessary is to determine the maximum depth to

the water while pumping and the amount of water the customer requires. Then turn to the capacity table and select the size head, horse power and size of well cylinder and pressure cylinder required. Then check up to be sure the well cylinder required will fit into the drop pipe in the customer's well; also

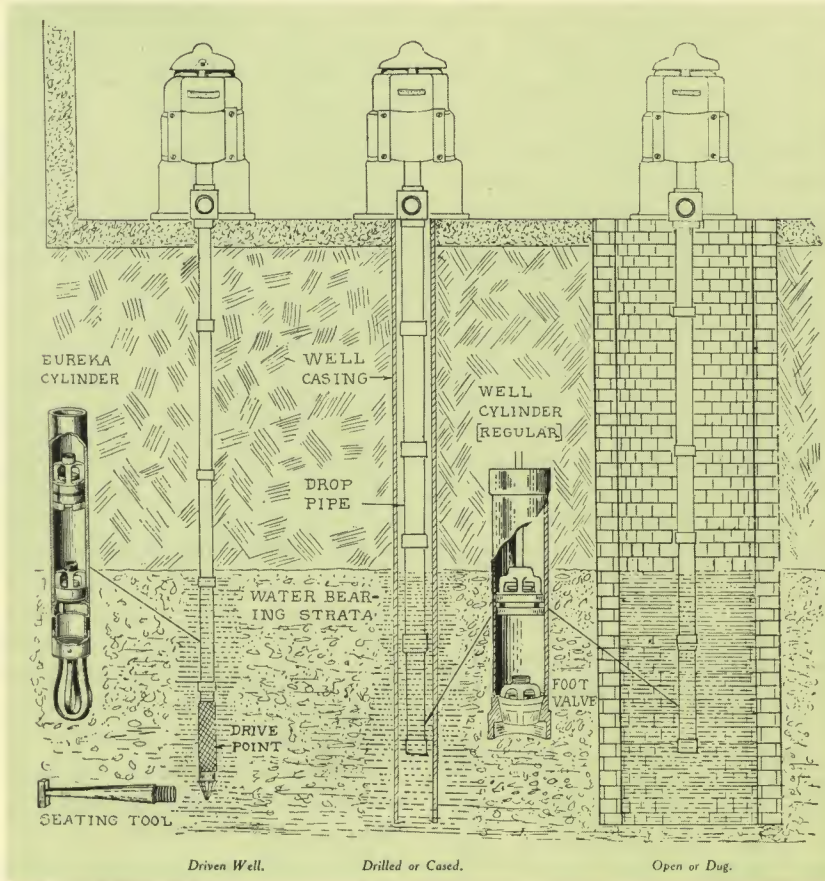


Fig. 51. Deep wells are primarily of three types: (From left to right) 1—Driven well. 2—Drilled or cased well. 3—Open or dug well.



check with the customer to be sure the well will yield the number of gallons per hour he is after. After doing this you can secure from the price page, price of the system complete less the pump rod, the well cylinder and the drop pipe. The matter of adding the well cylinder is a simple one, likewise the matter of quoting on the pump rod and drop pipe, both of which vary with the depth of the well on the particular job being considered.

As the Deep Well Plant must be installed directly over the well, oftentimes in cold localities where this necessitates placing the pump in an unheated pump house out in the yard, a frost-proof attachment is necessary. With the frost-proof attachment it is possible to operate the pump without bringing any of the water above the frost line until it gets to the point where it is to be used.

### Determining The Horsepower

However, to give you a better understanding of deep well pumping we will illustrate how "horsepower" is figured.

The first thing that must be known is the *maximum depth* that it is necessary to go to get water, and the second thing the "weight" of the water that has to be lifted per minute. For example: Suppose the customer had to go down 100 feet to get water; that he had a 2¾ inch cylinder in his well; that he had a 8 inch stroke pump head that at a certain speed gave him 50 strokes per minute, how much horsepower would be required?

First get the pounds per minute that the pump will have to lift. Turn to cylinder table No. 6 in the engineering section located in the back of this book. You will note a 2¾

inch cylinder with 8 inch stroke has a capacity per stroke of .2057 gallons. At the rate of 50 strokes a minute the pump would lift 50 x .2057 or 10.285 gallons per minute. We know 1 gallon of water weighs 8 1/3 pounds; therefore 10.285 gallons would weigh 85.8 pounds. 85.8 pounds lifted through a distance of 100 feet is the equivalent of 100 x 85.8 or 8580 foot-pounds.

33,000 foot pounds per minute equal one horsepower, therefore 8580 foot pounds are equivalent to

$\frac{8580}{33000}$  or .26 horse power. This is the theoretical power required on the basis of the pump having an operating efficiency of 100%. The actual efficiency, however, will probably run only 30% or 40% so the theoretical horse power should be multiplied by about 3 to get the actual horse power required. In this case it would be 3 x .26 or .78 H.P. actual.

It is not necessary for you to go to all this trouble in order to sell a F-M deep well head, however. The horse power calculations are all taken care of for you on the pages showing the prices. All you have to do is to determine the maximum depth to the water while pumping, find out the amount of water required, then go to the table and get the horse power.

### Pressure Tank Systems

Where a pump is required to discharge against pressure in a pneumatic tank, this will make an added load on the pump. Suppose the pump referred to in the previous example had to discharge into a tank, the pressure in which varied from 20 to 40 pounds.

Take the maximum pressure (40 pounds) and reduce this to

feet. This means that the pump, in addition to lifting the water 100 feet to get it out of the well, will have to lift it the equivalent of 92.40 feet (40 x 2.31) in order to get it into the tank against 40 pounds pressure. The "pounds" of water would remain the same because we have done nothing to either the size of the cylinder, the length of the stroke, or the number of strokes. Therefore in this case the theoretical horse power would be

$$\frac{192.40 \text{ (ft.)} \times 85.8 \text{ (lbs.)}}{33000} = .50 \text{ H.P.,}$$

instead of .26 as in the previous case.

### Advantage of Pressure Cylinder

Fairbanks-Morse Home Water Systems do not do all of the work on the up-stroke however. On the up-stroke they lift the water into a pressure cylinder which is located just above the discharge opening of the pump. On the downstroke, when the well cylinder plunger is returning to its position at the bottom of the cylinder, the plunger of the pressure cylinder forces the water out through the discharge opening *into the tank*.

It is very apparent that greater operating efficiency can be secured from a deep well head designed upon these principles than from one on which the head has to do *all* of its work on the up-stroke and run idle on the down stroke. By checking capacity tables, it will be found that less horse power is invariably required with a Fairbanks-Morse head to get a certain number of gallons at a certain depth than is necessary in the case of a head that does not employ the pressure cylinder principle of operation.



# FAIRBANKS-MORSE

## Electric Self-Oiling Deep Well Water Systems Types "B" and "C"



The Fairbanks-Morse Deep Well Pumps illustrated in this section have won for themselves an enviable reputation for dependable performance on those installations where the vertical distance from the pump to the source of supply is greater than the 22 foot limit of the shallow well pump. Neat, compact, substantially built and efficient. Available in 6, 9 and 12 inch strokes. Pressure cylinder included as standard equipment with all sizes. Equal distribution of load thus resulting on up and down strokes makes possible greater capacity or greater operating depth for a given size motor than that obtainable with the ordinary deep well pump.

Fig. 53. Fairbanks-Morse Electric Type "C" Deep Well Water System complete with pump, top-mounted motor, tank, pipe and control equipment ready to receive the drop pipe and house service connections.



# Fairbanks-Morse Electric Deep Well Water Systems

With Types "B" and "C" Pump Heads

Designed for pumping from driven, open or cased wells where the water lift is greater than 22 feet. Sizes 6, 9 and 12 inch stroke for power requirements of  $\frac{1}{3}$  to 5 H.P.

Fairbanks - Morse Electric Water Systems, Types "B" and "C," are intended for deep well service where the vertical distance from the pump to the source of supply is greater than the 22 foot limit of the "shallow well" pump.

These deep well pump units comply in every detail with the rigid standards for which Fairbanks-Morse quality products are noted. Both pump and motor are made by Fairbanks-Morse and the complete assembly is tested carefully as a unit in the F-M factory before shipment.

## Built By Pump Specialists

Fairbanks - Morse are pump specialists. In addition to their standard pump units in the smaller sizes which are sold in ever-increasing thousands each year, the company also manu-

factures an extensive line of large pumping equipment for municipal and other special service. The same care and excellence of manufacturing supervision that characterizes all F-M large pumping machinery is apparent in the design and

self-oiling  
automatic---efficient  
carefully balanced  
smooth operating

construction of these smaller and popularly priced water systems.

The motor driven water systems here described are offered in sizes up to 5 H.P. and are suitable for pumping service

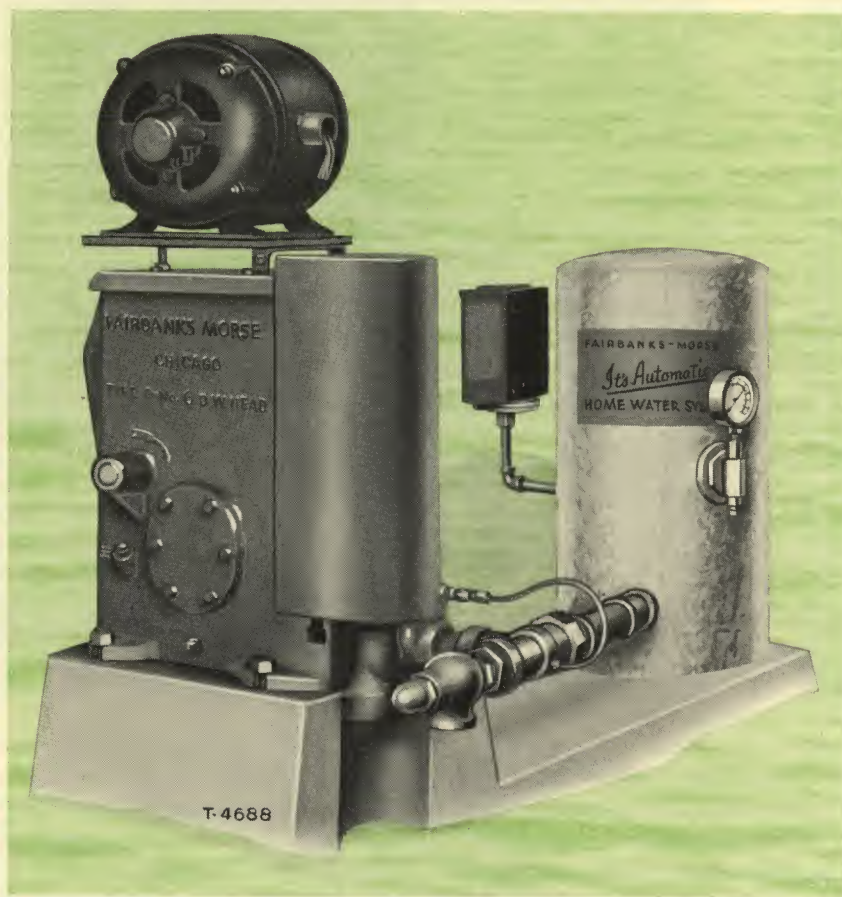


Fig. 54. The No. 6 Fresh Water Unit. A complete automatic pressure system for operation without a large storage tank. Pump operates whenever water is drawn. The 15 gallon tank, in addition to supplying the necessary air cushion to the system, acts as a small water reservoir to keep the pipe system filled so that water will flow just as soon as faucet is opened.



on farms, estates, plantations, ranches, apartment houses, small hotels, railroad stations, roadside filling stations, factories, country schools and churches, dairies, etc.; in fact, they can be used wherever running water under pressure is desired. They may be used for either open tank or for pressure tank service.

### Priced Complete

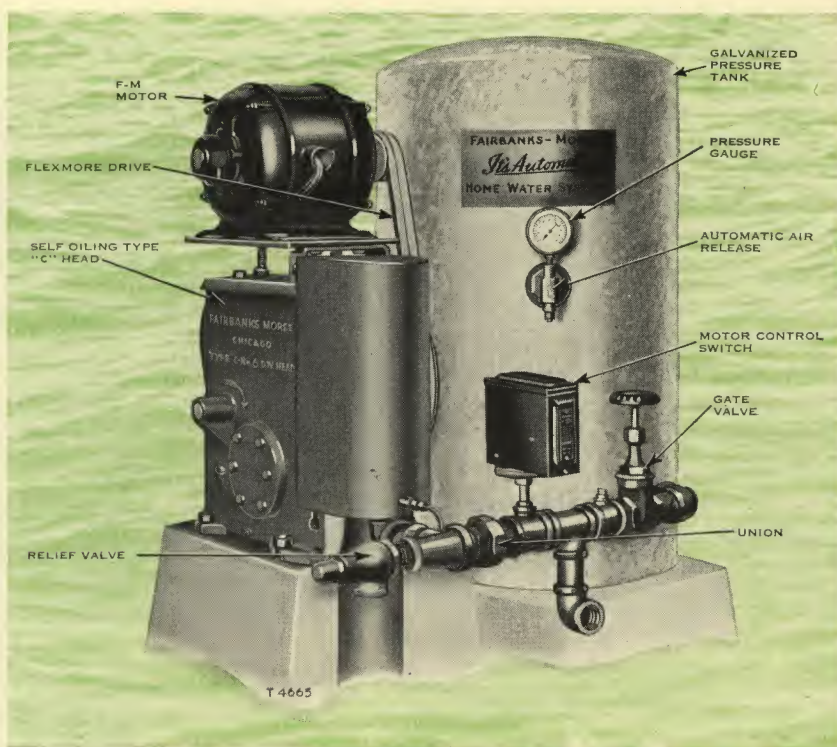
For the sake of convenience the two smaller and more popular sizes—namely the 6 and 9 inch stroke pumps—are assembled as a complete unit for pressure service. These outfits are priced complete as illustrated in figures 53 and 55, with pump, motor, tank, pipe and control equipment—in fact everything needed for the installation. Nothing left to add with the exception of the pump rod, the well cylinder, the drop pipe and house service pipe connection.

### Pump Head

The pump unit used in these water systems is the F-M Self-Oiling Pump Head, Type "C" in the 6" stroke size; Type "B" in the 9" and 12" stroke. The working mechanism of each is fully described and illustrated on the pages following.

### Pressure Tank

The tank is electrically welded and built for an operating pressure of 75 lbs., being subjected in manufacture to a test pressure of 150 pounds.



The tank is carefully galvanized inside and out.

While only two sizes of tanks are listed in the complete tank unit assemblies, namely, the 35 and 70 gallon, larger sizes of tanks are available and can be substituted at slightly higher price if added storage capacity is desired.

A pressure gauge is part of the tank equipment as well as automatic air regulator which acts as an air release valve and prevents the system from becoming air bound. Relief valve, union, shut-off valve, nipples, motor control switch, air control, etc., are all included in the regular pump - to - tank piping shown in the illustration.

### Fresh Water Attachment

The outfits as illustrated in Figure 55 are identical in serv-

Fig. 55. Complete water systems with Fresh Water Attachment. These systems are the same as illustrated in Fig. 53 except with fresh water valve and connections added. The fresh water valve permits of drawing water directly from the well instead of through the storage tank. The attachment is preferred by many, particularly when a large storage tank is used.

ice with those just described except the fresh water attachment is included. This attachment will permit of drawing water directly from the source of supply without passing through the storage tank. In other words, the pump will start whenever any faucet on the fresh water service line is open.

This feature is particularly desirable where a large storage tank is used. With tanks smaller than 220 gallon capacity the fresh water attachment



rarely is necessary and it is not recommended.

### Motors

The motors used in these water systems are of the customary Fairbanks - Morse high quality construction. They are guaranteed to deliver their full horsepower rating under conditions of full load continuous operation without exceeding a temperature rise of 40° C above the surrounding room temperature. Both the top mounted motors as used in the No. 6 Type "C" assembly and the tandem mounted motors as used on the larger No. 9 and 12 Type "B" assemblies are provided with an adjustment for tightening the belt.

### Flex-Mor Drive

The drive is the Flex-Mor "V" belt used extensively by Fairbanks - Morse for heavy duty power transmission in municipal and industrial pumping and generating service. It is a clean, silent, positive drive requiring no lubrication whatever. The Flex-Mor is one of the most satisfactory drives on the market from every operating angle.

### Automatic in Operation

The motor control pressure switch, mounted on the tank, automatically starts the pump when the pressure in the tank falls to 20 pounds and automatically stops it when the tank pressure reaches 40 pounds. The correct tank pressure for best operation is thus always maintained.

▼ ▼ ▼

Fig. 56. The No. 6 Self-Oiling Type "C" pump-motor unit with end cover removed, showing the pressure cylinder and air compressor details. A pressure cylinder with two-leather plunger is furnished as part of the standard equipment with all of the pumps here described.

▼ ▼ ▼



### Other Accessories

Other accessories furnished with the complete tank systems illustrated include a relief valve as a protection against over pressure; a check valve to keep the water in the tank from being forced back into the well; a shut-off valve, air tubing, union, ells, nipples, etc. A drive guard may be had where necessary at a small additional charge.

### Open Tank Pumping

For open tank pumping all that is required is the pump-motor unit only (as illustrated in Figs. 56 and 57), less the air compressor. If the water has to be elevated above the pump discharge opening use the pressure tank capacity table instead of the open tank table. The

open tank capacities are for discharge at the surface of the ground.

### One Undivided Responsibility Means One Undivided Guaranty

In these water systems, the power unit, the pump unit and even the Flex - Mor drive are built by Fairbanks-Morse. This means these pumps are designed and built to function as a *unit*. They are tested as a unit in the F-M factory before shipment. Responsibility for the satisfactory performance of the *entire* outfit, therefore, is undivided. Lastly, parts for any part of the outfit can be obtained from a single source in case any are ever required. No other water system manufacturer can offer these features.



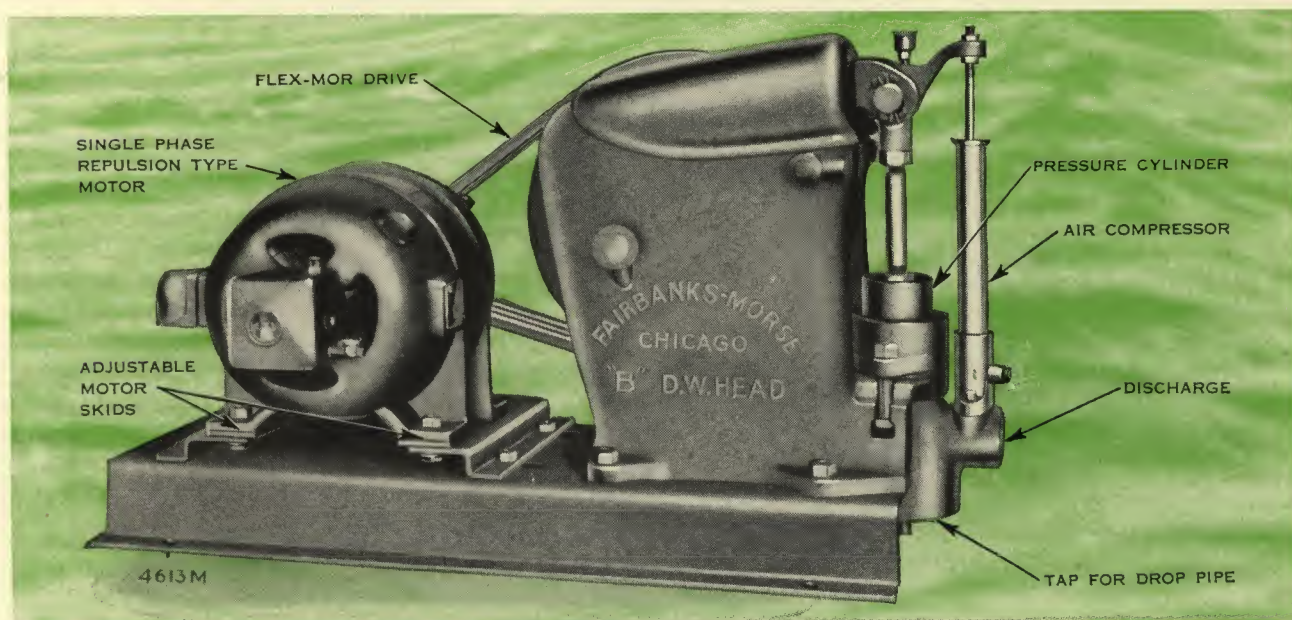


Fig. 57. The larger sizes, namely the No. 9 and No. 12 Type "B" pumps are furnished with the motor mounted tandem on a substantial steel base as illustrated above. Convenient adjustment for belt take-up is provided by means of adjustable motor plates. After the initial take-up, adjustment is seldom required with the Flex-Mor method of drive.

### CAPACITY TABLES—MOTOR DRIVEN DEEP WELL PUMPS—TYPES "B" AND "C"

Select from the table below the stroke, horsepower and pressure cylinder required to give the desired number of gallons of water from the particular depth being considered. Then select the pump required from table on next page. Order by outfit number.

#### 6" Stroke—Type "C" Pump

Capacity G.P.H.	Well Cylinder Required	Size Wood Rod Recom- mended	Pressure Cylinder Furnished with Pump	Drop Pipe		Pressure Tank Service				Open Tank Service			
				Size Recom- mended	Can be Used in Well Casing	Max. Lift in Ft. for H.P. Indicated when Pumping Against a Pressure of 40 lbs., Max.				Max. Lift in Ft. from Pump to Lowest Water Level when discharging at Surface of Ground			
						1/8 H.P.	1/2 H.P.	3/4 H.P.	1 H.P.	1/8 H.P.	1/2 H.P.	3/4 H.P.	1 H.P.
104	1 3/8"	1 7/16"	1 1/4"	1 1/2"	3"	120'				160'			
180	1 15/16"	1 1/8"	1 1/2"	2"	3"	50'				120'			
180	1 15/16"	1 1/8"	2 1/16"	2"	3"		133'	*298'					
180	1 15/16"	1 1/8"	2 1/2"	2"	3"			200'	*298'		230'	*298'	*298'
275	2 1/4"	1 1/8"	1 1/2"	2 1/2"	3 1/2"					70'			
275	2 1/4"	1 1/8"	2 1/16"	2 1/2"	3 1/2"		80'						
275	2 1/4"	1 1/8"	2 1/2"	2 1/2"	4 1/2"			170'	250'		130'	210'	*298'
415	2 3/4"	1 1/8"	1 1/2"	3"	4 1/2"					45'			
415	2 3/4"	1 1/8"	2 1/16"	3"	4 1/2"		30'						
415	2 3/4"	1 1/8"	2 1/2"	3"	4 1/2"			100'	150'		80'	135'	190'
** 580	3 1/4"	1 1/8"	2 1/2"	3 1/2"	5"			40'	75'		55'	90'	130'

\*This is the maximum depth for which the No. 6 Head is recommended.

†7/16" steel rod is recommended where 1 3/8" well cylinder is used. \*\*When 3 1/4" well cylinder is used, a flange is necessary in the drop pipe.

#### 9" Stroke—Type "B" Pump

						1 H.P.	2 H.P.	3 H.P.	1 H.P.	2 H.P.	3 H.P.
270	1 15/16"	1 3/8"	2 1/16"	2"	3"	190'	*380'				
270	1 15/16"	1 3/8"	2 1/2"	2"	3"	110'	*380'	*380'	300'	*380'	*380'
425	2 1/4"	1 3/8"	2 1/16"	2 1/2"	3 1/2"	170'					
425	2 1/4"	1 3/8"	2 1/2"	2 1/2"	3 1/2"	100'	*380'	*380'	240'	*380'	*380'
625	2 3/4"	1 3/8"	2 1/2"	3"	4 1/2"	90'			140'		
625	2 3/4"	1 3/8"	3 1/2"	3"	4 1/2"		185'	380'		270'	*380'
865	3 1/4"	1 3/8"	2 1/2"	3 1/2"	5"	40'			95'		
865	3 1/4"	1 3/8"	3 1/2"	3 1/2"	5"		160'	253'		185'	270'
1160	3 3/4"	1 3/8"	3 1/2"	4"	6"		100'	170'		135'	200'

\*This is the maximum depth for which the No. 9 Head is recommended.

#### 12" Stroke—Type "B" Pump

						3 H.P.	5 H.P.	3 H.P.	5 H.P.
875	3 1/4"	1 5/8"	3 1/2"	3 1/2"	5"	290'			
875	3 1/4"	1 5/8"	4 1/2"	3 1/2"	5"	150'	430'	310'	450'
1160	3 3/4"	1 5/8"	3 1/2"	4"	6"	200'			
1160	3 3/4"	1 5/8"	4 1/2"	4"	6"	140'	330'	210'	330'
1500	4 1/4"	1 5/8"	4 1/2"	4 1/2"	6"	120'	250'	160'	250'
1865	4 3/4"	1 5/8"	4 1/2"	5"	7"	90'	180'	125'	200'
**2730	5 3/4"	1 5/8"	4 1/2"	6"	8"	35'	85'	80'	130'

\*\*When 5 3/4" well cylinder is used, a flange is necessary in the drop pipe.



Table 1—Prices—Motor Driven Deep Well Water Systems—Types "B" and "C"

Prices Include:

1. Self-Oiling Deep Well Pump
2. Pressure Cylinder (Specify Size)
3. Air Compressor
4. F-M Repulsion, 60 cycle, single phase motor (rated on continuous full load duty basis)
5. Formed steel sub-base and adjustable base plates for motor (Applies to 9" and 12" stroke pumps only; on 6" size, motor is mounted on top of pump.)
6. Flex-Mor Drive  
No well cylinder, drop pipe or pump rod included.

Description		No. of Belts Used	Outfit No.	Code Word	Approx. Shipping Weight, Lbs.	Price
6" Stroke—Type "C"	With 1/8 H.P. Motor and 1 1/4" Pressure Cylinder.....	1	T633A	VIHYN	240	\$106.00
	With 1/2 H.P. Motor and 2 1/16" Pressure Cylinder.....	1	T650B	VIHIO	245	112.00
	With 1/2 H.P. Motor and 2 1/2" Pressure Cylinder.....	1	T650C	VIIBP	245	112.00
	With 3/4 H.P. Motor and 2 1/16" Pressure Cylinder.....	2	T675B	VIHZO	270	124.00
	With 3/4 H.P. Motor and 2 1/2" Pressure Cylinder.....	2	T675C	VIIDR	270	124.00
9" Stroke—Type "B"	With 1 H.P. Motor and 2 1/2" Pressure Cylinder.....	2	T610C	VIIFT	275	135.50
	With 1 H.P. Motor and 2 1/2" Pressure Cylinder.....	2	9001B	VIIGV	610	215.00
	With 2 H.P. Motor and 2 1/2" Pressure Cylinder.....	2	9001C	VIKZ	610	215.00
	With 2 H.P. Motor and 2 1/2" Pressure Cylinder.....	4	9002B	VIIOC	665	253.50
	With 2 H.P. Motor and 2 1/2" Pressure Cylinder.....	4	9002C	VIIPD	665	253.50
12" Stroke—Type "B"	With 2 H.P. Motor and 3 1/2" Pressure Cylinder.....	4	9002E	VIJY	665	253.50
	With 3 H.P. Motor and 3 1/2" Pressure Cylinder.....	6	9003C	VIIRF	725	305.00
	With 3 H.P. Motor and 3 1/2" Pressure Cylinder.....	6	9003E	VIINB	725	305.00
	With 3 H.P. Motor and 4 1/2" Pressure Cylinder.....	6	1203E	VIISG	1135	450.00
	With 5 H.P. Motor and 4 1/2" Pressure Cylinder.....	6	1203G	VIITH	1135	450.00
		8	1205G	VIIWK	1250	518.00

Table 2—6" Stroke—Pressure Tank Units Complete with Pump-to-Tank Piping and Galvanized Pressure Tank

	1/8 H.P.			1/2 H.P.			3/4 H.P.			1 H.P.		
	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price
Pump Unit (Table 1)	T633A	240	\$106.00	T650B	245	\$112.00	T675B	270	\$124.00	T610C	275	\$135.50
*Piping Package.....	6803	45	22.00	6803	45	22.00	6803	45	22.00	6803	45	22.00
35 Gal. Galv. Tank	5476	75	16.00	5476	75	16.00	5476	75	16.00	5476	75	16.00
**Outfit Complete:												
With 35 Gal. Tank	T633A-35	360	144.00	T650B-35	365	150.00	T675B-35	390	162.00	T610C-35	395	173.50
With 70 Gal. Tank	T633A-70	395	152.50	T650B-70	400	158.50	T675B-70	425	170.50	T610C-70	430	182.00

\*Piping Package:—Standard piping package consists of Pressure Switch, Air Control, Pressure Gauge, Check Valve, Relief Valve, Shut-off Valve and necessary union, ell, nipples, etc., to complete the pump-to-tank piping as illustrated. 1 1/4" pipe and fittings are furnished in the piping package for the No. 6 Pump; 2" pipe and fittings for the No. 9 Pump (listed in Table 4).

Table 3—6" Stroke—Fresh Water Unit Complete with Pump-to-Tank Piping and 15 Gal. Galvanized Air Chamber Tank  
(See Illustration on Page 40. Fig. No. 54)

	1/8 H.P.			1/2 H.P.			3/4 H.P.			1 H.P.		
	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price
Pump Unit (Table 1)	T633A	240	\$106.00	T650B	245	\$112.00	T675B	270	\$124.00	T610B	275	\$135.50
*Piping Package.....	8023	40	20.50	8023	40	20.50	8023	40	20.50	8023	40	20.50
15 Gal. Galv. Tank	8022	45	7.50	8022	45	7.50	8022	45	7.50	8022	45	7.50
**Fresh Water Unit Complete as Above	T633A-15	325	134.00	T650B-15	330	140.00	T675B-15	355	152.00	T610B-15	360	163.50

Fresh Water Piping Package:—(Outfit 8022). This is the same as standard piping package described above except shut-off valve is omitted.

Table 4—9" Stroke—Pressure Tank Units Complete with Pump-to-Tank Piping and Galvanized Pressure Tank

	1 H.P.			2 H.P.			3 H.P.			Add for Belt Guard When Wanted:
	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	Outfit No.	Shpg. Wght. Lbs.	Price	
Pump Unit (Table 1)	9001C	610	\$215.00	9002C	665	\$253.50	9003C	725	\$305.00	No. 6 Pump (Guard not furn.)
*Piping Package.....	6808	75	34.00	6808	75	34.00	6808	75	34.00	No. 9 Pump ..... \$ 6.75
35 Gal. Galv. Tank	5476	75	16.00	5476	75	16.00	5476	75	16.00	No. 12 Pump ..... 8.00
**Outfit Complete.....										
With 35 Gal. Tank	9001C-35	760	265.00	9002C-35	815	303.50	9003C-35	875	355.00	
With 70 Gal. Tank	9001C-70	795	273.50	9002C-70	850	312.00	9003C-70	910	363.50	

\*\*When ordering the complete tank jobs from tables 2, 3 and 4 be sure the letter suffix in the outfit number correctly indicates the size of pressure cylinder desired. Get from Table 1.

Tanks larger than the 35 and 70 gallon listed above can be supplied if desired. See Page 76 for prices.

Special Motors:—If a motor other than the standard 60 cycle single phase is desired, see page 84 for additions.

Frost Proof Attachment:—See Page 52 for Prices.

### Code Words for Complete Tank Outfits Listed Above:

Outfit	Code	Outfit	Code	Outfit	Code	Outfit	Code	Outfit	Code	Piping Packages Outfit Code
T633A-35	VHZAX	T675B-35	VIAJG	T633A-15	VIFAS	9001C-35	VICDY	9003C-35	VICWR	6803 VHSAD
T633A-70	VHZBY	T675B-70	VIAON	T650B-15	VIFBT	9001C-70	VICAV	9003C-70	VIDEY	8023 VHSBE
T650B-35	VIAAX	T610C-35	VIASP	T675B-15	VIFCU	9002C-35	VICMH			8022 VHSCE
T650B-70	VHZZW	T610C-70	VIBBX	T610B-15	VIFDV	9002C-70	VICVQ			6808 VHSDE



# FAIRBANKS-MORSE

## Engine Driven Self-Oiling Deep Well Water Systems Types "B" and "C"

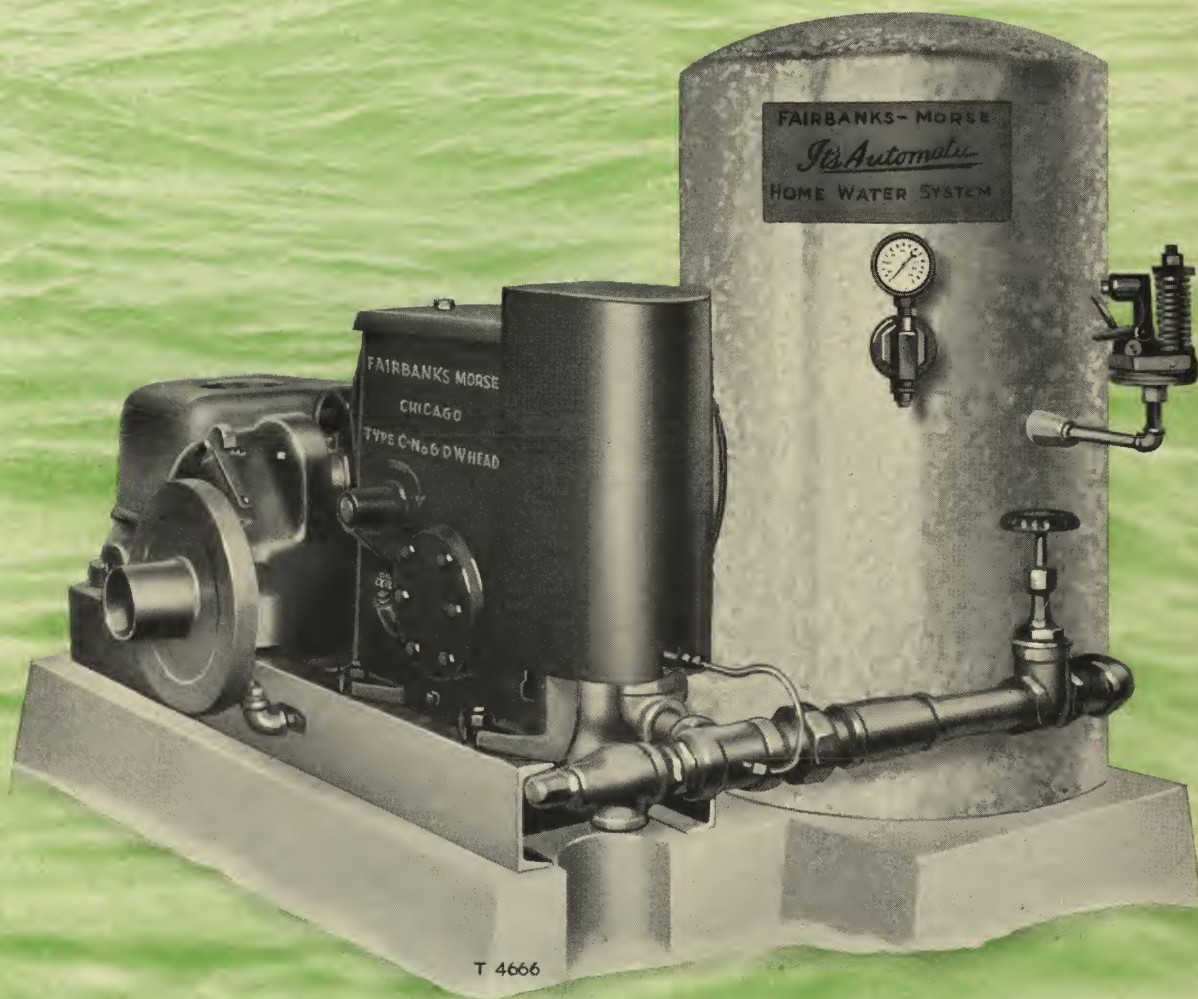


Fig. 58. The No. 6 Self-Oiling Type "C" Water System is available as a complete package unit as shown above including 1 1/2 H.P. "Z" Engine, tank, piping and Flex-Mor drive. Outfit No. 6728C-220B covers the unit complete with 220 gal. black tank.

Where electricity is not available and where the water level is more than 22 feet below the surface of the ground, the Fairbanks-Morse "Z" Engine Driven Water Systems herein described are recommended. Capacities up to 1160 gallons per hour. Powered by the Fairbanks-Morse, world-famous "Z" engine. Here again the complete unit, pump and driver, are made by Fairbanks-Morse, centering in one place the complete responsibility for the satisfactory operation of the unit and facilitating the matter of securing repairs should any be required.



## Fairbanks-Morse "Z" Engine Driven Deep Well Water Systems-- Types "B" and "C"

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For general pumping service where electricity is not available and where the vertical distance from the pump to the source of supply is greater than 22 feet. Sizes 1½ H.P. Engine with No. 6 Type "C" Pump; 3 H.P. Engine with No. 9 Type "B" Pump.

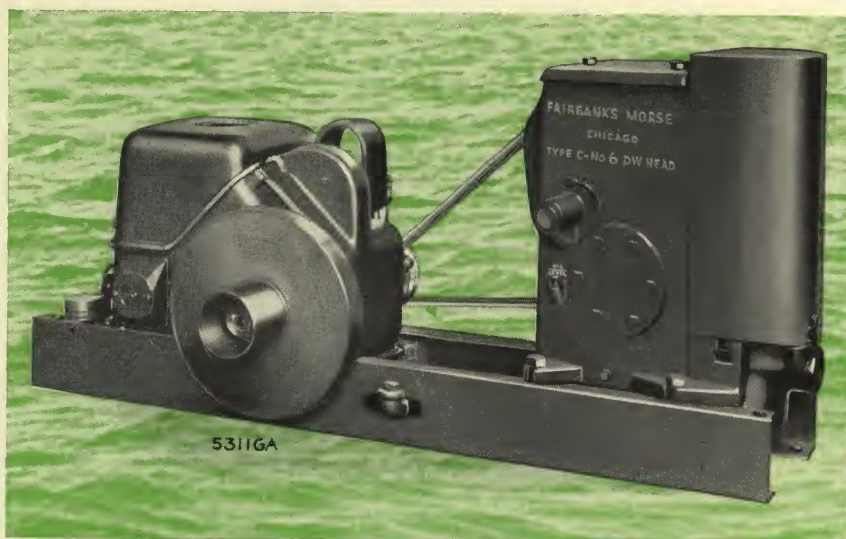
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Where the owner does not have electricity the Fairbanks-Morse Engine Driven Water Systems, described here, afford a very satisfactory and dependable means of supplying running water under pressure for deep well service.

The power unit is the famous F-M "Z" Engine, known the world over for its dependability and economy in operation.

The pumps are of the self-oiling type; the engines likewise are self-oiling. The drive is the Flex-Mor "V" belt—the most approved and up-to-date method of power transmission on the market. The complete outfit is assembled and tested as a unit in the F-M factory before shipment, assuring a perfect operating assembly.

The advantages of centralized responsibility in the purchase of a water system of this kind, both ends of which, engine and pump, are made by the same manufacturer, are very apparent. In addition to getting a combination in which both the pump and the driver are particularly adapted for operation as a unit, there is no shift-



ing of responsibility in case either part of the equipment fails to measure up to the required standard of satisfaction.

### Service

The engine driven water systems described here are offered in sizes up to 3 H.P. They are widely used for supplying water under pressure on farms, estates, plantations, ranches, golf courses, railroad stations, roadside filling stations, factories, country schools and churches, dairies and any other service where a large amount of water is required and electric current is not to be had.

The engine driven assembly illustrated in Figure 58 is priced complete as you see it with nothing left to add with the exception of the pump rod, the well cylinder, the drop pipe and house service pipe connections. Both air volume control and pressure operated ignition grounding switch for stopping the engine when the tank pressure reaches 50 lbs. are fur-

▼ ▼ ▼

Fig. 59. The No. 6 Self-Oiling Type "C" Deep Well Head with 1½ H.P. Self-Oiling "Z" Engine is shown above.

▼ ▼ ▼

nished as part of the complete tank assemblies as well as complete pump-to-tank pipe and fittings consisting of relief valve, check valve, shut-off valve, union, ells, nipples, etc.

### Pressure Tanks

The tanks regularly listed with the complete engine operated pressure tank systems are of 220 gallons capacity, of electrically welded construction designed for 75 pounds working pressure and are subjected to a test pressure of 150 pounds per square inch before leaving the factory. Inasmuch as the operating pressure range for ordinary water system service, engine operated, is 30 to 50 pounds, the standard tank has a very liberal factor of safety.

A black tank is furnished as



standard, but a galvanized tank can be substituted if desired at a slightly higher price. Also tanks larger than 220 gallons can be supplied if added storage capacity is needed. The black tanks are painted with two coats of preservative paint; the galvanized tanks are thoroughly galvanized inside and out.

### Automatic Air Control

The complete engine-operated pressure tank systems are provided with automatic air control. This device, which is mounted in the tank, acts as a float-operated air release valve and automatically maintains the correct proportion of air in the tank for most efficient operation. There is thus no chance for the tank to become air bound. A pressure gauge is regularly furnished as a part of the standard accessories on the complete tank outfits.

### Automatic Stop

Being engine driven, the complete pressure tank system will not start automatically, but the engine ignition switch, located on the tank, is set to ground the ignition and stop the engine when the pressure in the tank builds up to 50 pounds. Thus, all that it is necessary to do is to see that there is oil and fuel in the engine, give it a turn and let it run. When the tank is properly filled the pump will stop automatically.

### Easy Starting

The Fairbanks-Morse "Z" engine used on the power end of these combinations has the reputation of being the easiest starting engine on the market. It has been a more or less general opinion in the past that a large storage tank is always

necessary with an engine operated system because of the difficulty in getting the engine in operation. This does not apply to F-M engine operated systems. You may use a tank as small as 220 gallons capacity if you desire to keep the cost at a minimum because the engine is not temperamental—it is always ready to start.

### High Tension Type "R" Magneto

Aside from the quality of workmanship in the engine itself, the chief contributing factor to the easy starting feature is the Type "R" High Tension Rotary Magneto made by Fairbanks-Morse exclusively for the "Z" engine. This magneto delivers the hot, fat spark necessary for easy starting. It also has a number of other unusual features that eliminate entirely the annoying troubles that have been experienced in the past with engine ignition.

It is sealed against dirt, dust and moisture. There is no necessity whatever for breaking the seals thereby destroying

the moisture proofing enclosure. The matter of lubrication is taken care of in the internal design of the magneto.

There are no internal adjustments of any kind to make such as point adjustments, bearing adjustments, etc. It is guaranteed to function properly. It carries on its end plate a definite guaranty date of one year and if it fails to function at any time within that period it will be exchanged without charge for a new magneto carrying the same guaranty provided the seals are not broken.

### Self-Oiling

Not only is the pump self-oiling, but the engine likewise is of the self-oiling type. The crank case serves as an oil reservoir, supplying oil to the bearings, pistons, etc., whenever the engine is in operation. All that is required to take care of the lubrication problem is to see that the crank cases of both the engine and the pump are properly supplied with oil. The magneto needs no attention whatever.

### The Pump

In the Self-Oiling Type "B" and "C" Deep Well Pump Heads, which form the pump end of these engine driven assemblies, you will find principles of up-to-date pump design followed in a manner that results in unusual simplicity of operation and strength of construction. All parts are abundantly lubricated by means of a positive oiling system. This together with the double gear drive feature results in a perfectly balanced load tending toward uninterrupted service and satisfactory performance.

More detailed specifications of the pumps will be found on pages following.

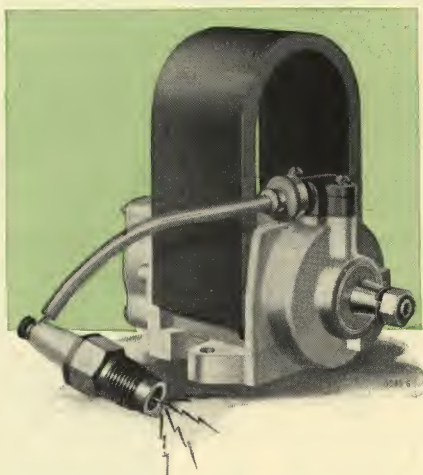


Fig. 30. The Type "R" High Tension Rotary Magneto made by Fairbanks-Morse exclusively for the "Z" Engine, insures easy starting of all F-M engine driven water systems.



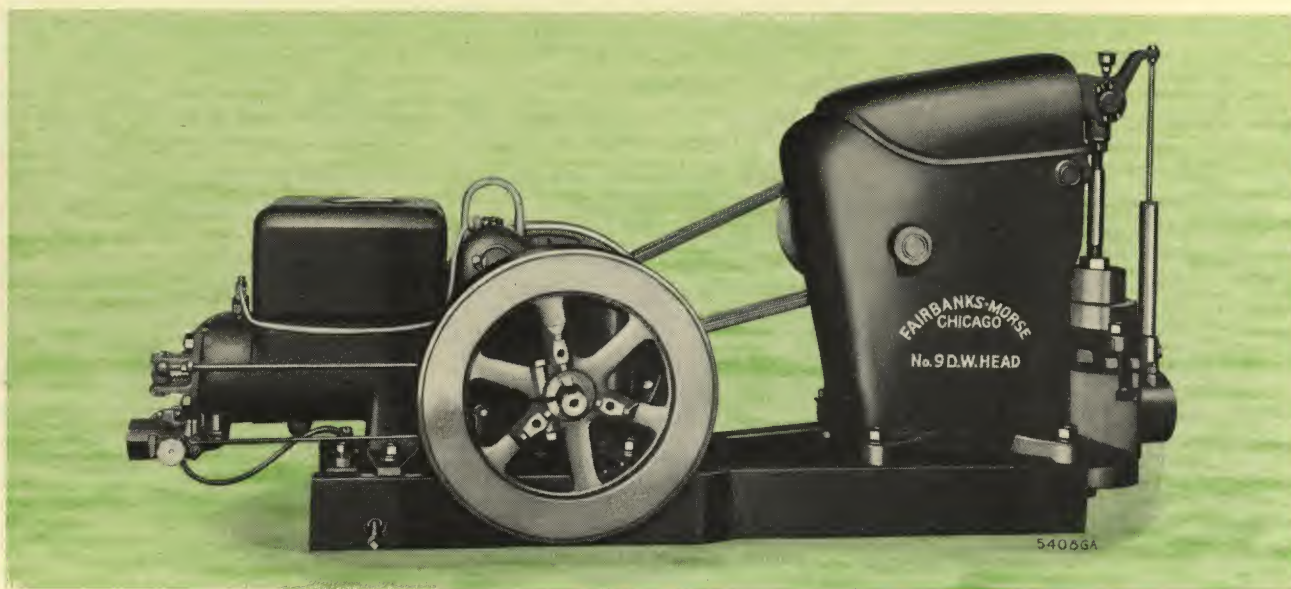


Fig. 60. The No. 9 Self-Oiling Type "B" Deep Well Head with 3 H.P. Self-Oiling "Z" Engine.

### CAPACITY TABLES

#### 6" Pump—1½ H.P. "Z" Engine

PRESSURE TANK SERVICE (50 Lbs. Discharge Pressure)			OPEN TANK SERVICE (Discharge at Surface)		
Depth to Water in Feet	Well Cyl. Required, Inches	Capacity in U. S. Gals. per Hour	Depth to Water in Feet	Well Cyl. Required, Inches	Capacity U. S. Gals. per Hour
125	2¾	415	188	2¾	415
250	2¼	275	280	2¼	275
300	1⅜	180	300	1⅜	180

#### 9" Pump—3 H.P. "Z" Engine

PRESSURE TANK SERVICE (50 Lbs. Discharge Pressure)			OPEN TANK SERVICE (Discharge at Surface)		
Depth to Water in Feet	Well Cyl. Required, Inches	Capacity in U. S. Gals. per Hour	Depth to Water in Feet	Well Cyl. Required, Inches	Capacity U. S. Gals. per Hour
90	3¾	1160	135	3¾	1160
140	3¼	865	180	3¼	865
185	2¾	625	270	2¾	625
*290	2¼	425	375	2¼	425

\*For this extreme depth order the pump with 2½" pressure cylinder. To do this simply order the outfit with the letter "C" after the outfit number instead of "E".

### Prices—Engine Driven Deep Well Water Systems

**Equipment:**—Prices include Self-Oiling pump with well-known Fairbanks-Morse self-oiling "Z" engine and Flex-Mor drive, all mounted on an extra heavy channel iron base. F-M Magneto ignition on engine for easy starting. Pump is regularly equipped with pressure cylinder. No well cylinder, pump rod, tank or piping included. Drive guard not included but can be furnished as an extra.

PUMP								ENGINE		UNIT COMPLETE				
Stroke	Type	R.P.M.	Strokes per Min.	Size Pressure Cylinder, In.	Piston Rod Threads, In.	Drop Pipe Tap, In.	Discharge Pipe Tap, In.	H.P.	R.P.M. of Drive Shaft	No. of Belts in Drive	Outfit No.	Code Word	Approx. Shpg. Wt., Lbs.	Price
6	"C"	350	50	2½	5/8x12	3	1¼	1½	1500	3	6728C	VIHNC	420	\$165.00
9	"B"	350	50	3½	7/8x10	4	2½	3	800	6	6772E	VIHPE	790	\$328.00

### Prices—Engine Driven Deep Well Water Systems Complete with 220 Gal. Tank

ITEM	6" PUMP WITH 1½ H.P. ENGINE				9" PUMP WITH 3 H.P. ENGINE			
	Outfit No.	Approx. Shpg. Wt., Lbs.	Code Word	Price	Outfit No.	Approx. Shpg. Wt., Lbs.	Code Word	Price
Pump Unit (From Table Above).....	6728C	420	VIHNC	\$165.00	6772E	790	VIHPE	\$328.00
*Piping and Accessory Package.....	6806	45	VHRNS	26.50	6807	80	VHROT	41.00
220 Gal. Black Tank.....	6887	410	VHBJE	38.00	6887	410	VHBJE	38.00
System complete with 220 Gal. Black Tank	6728C-220B	875	VIEAT	229.50	6772E-220B	1280	VIEGQ	407.00
System complete with 220 Gal. Galv. Tank	6728C-220G	905	VIEBU	236.50	6772E-220G	1310	VIEHA	414.00

\*Piping and Accessory Package:—Consists of air control, pressure gauge, magneto grounding switch, shut-off valve, relief valve, check valve necessary union, ells, nipples to complete pump-to-tank piping as illustrated.

**Pumps for Open Tank Service:**—Deduct \$4.00 for the omission of the air compressor attachment in the case of the No. 6 pump; \$5.00 in the case of the No. 9 pump. **Frost Proof Attachment:**—Use additions given on page 52. **Belt Guard:**—When required, add \$6.50 to list price of either No. 6 or No. 9 combination.



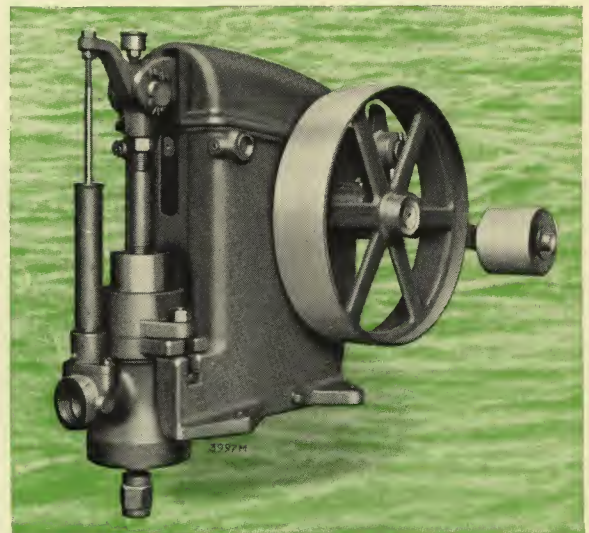
## General Design of F-M Deep Well Pump Heads - - Types "B" and "C"

closure for the working parts of the pump head.

**Strongly Constructed Throughout**  
Combining all the features in

The Fairbanks-Morse Self-Oiling Deep Well Pump Heads have many desirable features. They are correctly designed. The simplicity and strength of the mechanism in both the Types "B" and "C" pumps, together with the fact that all working parts are abundantly lubricated by means of a positive oiling system, result in a design that will give long and satisfactory service with a minimum amount of attention and low operating expense.

Fig. 61. Fairbanks-Morse Self-Oiling Type "B" Deep Well Pump Head with discharge chamber, pressure cylinder and air compressor in place. Furnished in either 9 or 12 inch strokes.



### Completely Enclosed

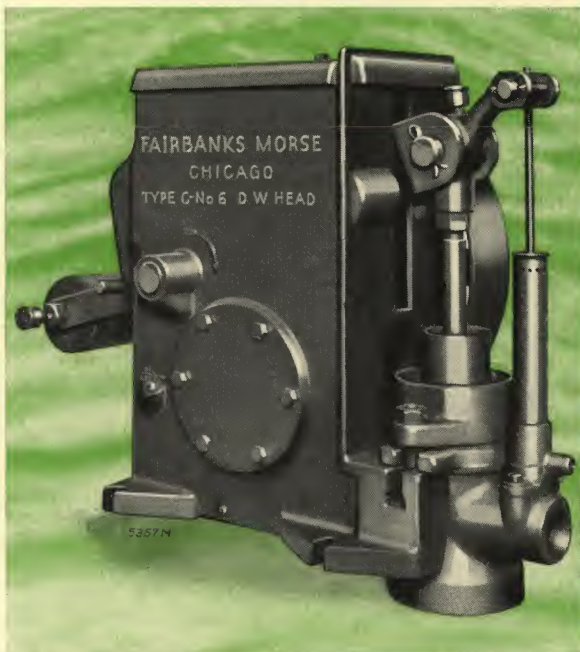
In both designs the entire working mechanism is enclosed in a cast iron base or main frame which forms the oil res-

ervoir, in which the interior mechanism operates. This main frame carries all the bearings, and with its removable cast iron cover, forms a complete en-

the base casting in this way permits of a frame design which gives the pump greater rigidity, minimizes the possibility of strains and makes for an unusually strong and compact construction. This type of design also eliminates the need of any lugs, outside ribs or projections that might become broken.

The frame casting is completely machined in special jigs at one setting so that accurate alignment of all shafts and bearings is assured. Bearing shafts are of high grade machine steel. All shafts and working parts are readily removable. All the bearings are highly polished steel on finished smooth cast iron. This combination forms a bearing that is especially serviceable when properly lubricated, and in these heads

Fig. 62. Fairbanks-Morse Self-Oiling Type "C" Deep Well Pump Head with discharge chamber, pressure cylinder and air compressor in place. Furnished only in the 6 inch stroke.





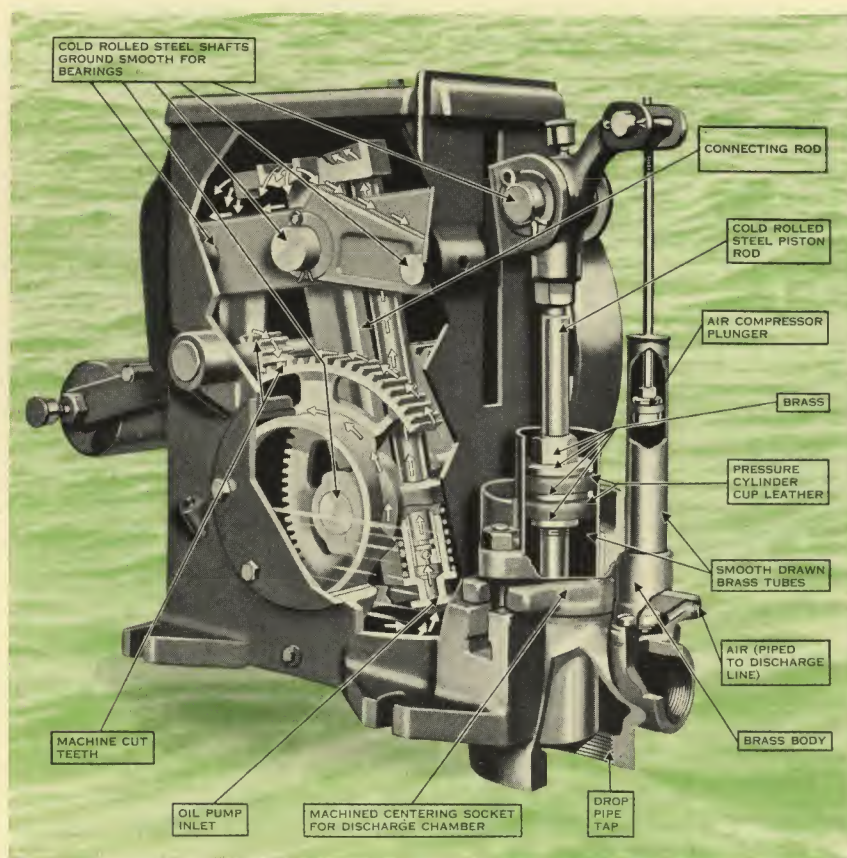


Fig. 63. Cross sectional view of Fairbanks-Morse Type "C" Deep Well Pump Head, showing internal mechanism and oiling system.

and lower valve of the well cylinder may be withdrawn when ever necessary without disturbing the suction and discharge pipe connections.

### Air Compressor

When used for pressure tank service an air compressor is necessary to replenish the air occasionally. When either style of pump head is ordered for pressure tank service, therefore, it is fitted with an air compressor attachment, the piston of which is driven from the upper end of the piston rod or cross-head. This provides a very simple, dependable and inexpensive way to keep the system supplied with air.

### Pressure Cylinder

All Fairbanks-Morse deep well heads are furnished with a pressure cylinder which bolts to the discharge chamber of the pump. This pressure cylinder is equipped with a plunger of the double cup leather type. On the up-stroke of the pump the water from the well fills the pressure cylinder and on the downstroke it is forced, under pressure, from the pressure cylinder into the storage tank.

The pressure cylinder permits of practically an equal division of the load between the up and down strokes of the

perfect lubrication is assured because every bearing is flooded with oil at all times.

### Balanced Drive

In both the Types "B" and "C" pump heads, the two steel drive pinions are machine cut integral with the pinion shaft to which is attached the drive pulley. This double drive feature together with the fact that all other parts are in pairs, as well as the fact that the connecting rod is located in the middle of the head between the two main crank gears, results in a perfectly balanced load without side forces to tend to wear the working parts out of line.

### Positive Oiling System

In both pumps the lower part of the base acts as the oil reser-

voir from which the main gears carry the oil to the pinions. In addition to this splash oiling, a simple positive pump carries a continuous, copious stream of oil upward to all the parts reaching them through intercommunicating oil passages in the connecting rod and cross head mechanism.

### Discharge Chamber

The discharge chamber is a separate casting which can be attached to the drop pipe and then bolted to the main base or frame casting.

Note the manner in which the discharge chamber is supported by the main base of the pump head. This is important as it carries the entire weight of the well pipe. The plunger



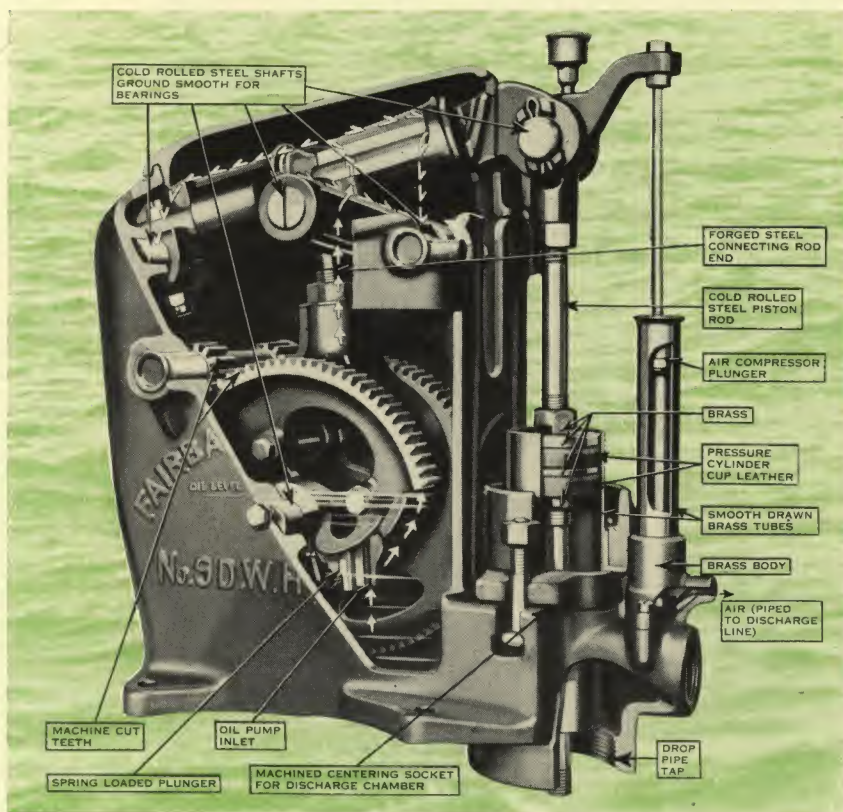


Fig. 64. Cross sectional view of Fairbanks-Morse Type "B" Deep Well Pump Head, showing internal mechanism and oiling system.

banks-Morse make a complete line of electric motors and a complete line of dependable gasoline engines so no matter what the requirements, there is a Fairbanks-Morse complete unit water system to take care of the job. Special bulletins covering these complete unit systems will be furnished on request.

pump. This results not only in greater efficiency of the pump but also in much smoother operation than if the entire load of lifting and forcing were done on the up-stroke alone.

Because of the pressure cylinder method of operation, Fairbanks-Morse deep well pumps will pump more water from a given depth than the ordinary deep well pump of identical horse power. Or, with the same horse power applied, Fairbanks-Morse deep well pumps will work well cylinders at greater depths than a pump that does not have this desirable pressure cylinder feature.

While the pressure cylinder is designed primarily for pressure tank service, it is also recommended for open tank service where the pump has to operate against any head on the discharge, such as that occa-

sioned by a long run of discharge pipe or that imposed when the pump has to discharge into an open tank located above the level of the ground.

### For Belted Service

The pumps for belted service, are regularly furnished with pulley and belt tightening idler for flat belt drive. This modification is for the man who already has a motor or engine and wishes to make up his own combination. However Fairbanks-Morse deep well pumps are available also as complete electric motor or engine operated units and it is strongly urged that the pump be ordered complete with power as in this way the responsibility for the satisfactory performance of the entire unit will be centered in one place. Fair-



Fig. 65. Showing manner of attaching frost proof set length to the F-M Self-Oiling Type "C" Deep Well Pump Head. Illustration shows pressure cylinder, and air compressor. The frost proof extension is available for either a 4 1/2 foot or 6 foot pit.



## DEEP WELL PUMPS FOR BELTED SERVICE

### Types "C" and "B"

Prices cover pump with pulley, belt tightening idler, pressure cylinder and air compressor. No well cylinder or pump rod included.

Size Pump (Stroke) Inches	Type	Pulley			Strokes per Minute	Piston Rod Threads		Size of Tap in Discharge Chamber for Drop Pipe, In.	Discharge Pipe Tap, Inches	Pressure Cylinder Furnished with Pump, Inches	Outfit No.	Code Word	Approx. Shpg. Weight, Lbs.	Price
		Diam., Inches	Belt Width, Inches	R.P.M.		Diam., Inches	Threads per Inch							
6	C	15	2 1/2	350	50	5/8	12	3	1 1/4	1 1/4	T576A	VIJAQ	175	\$72.00
6	C	15	2 1/2	350	50	5/8	12	3	1 1/4	2 1/16	T576B	VIJPB	175	72.00
6	C	15	2 1/2	350	50	5/8	12	3	1 1/4	2 1/2	T576C	VIJNA	175	72.00
9	B	20	4	350	50	7/8	10	4	2 1/2	2 1/16	5779B	VIJBO	410	127.00
9	B	20	4	350	50	7/8	10	4	2 1/2	2 1/2	5779C	VIJCP	410	127.00
9	B	20	4	350	50	7/8	10	4	2 1/2	3 1/2	5779E	VIJVI	410	127.00
12	B	32	4	262 1/2	37 1/2	7/8	10	5	3	3 1/2	6716E	VIJEQ	830	225.00
12	B	32	4	262 1/2	37 1/2	7/8	10	5	3	4 1/2	6716G	VIJGU	830	225.00

### Frost Proof Attachment

When frost proof attachment is wanted, make the following additions to the prices given

	For 4 1/2' Pit		For 6' Pit		Appr. Shpg. Wght., Lbs.	Add to Price
	Outfit No.	Code Word	Outfit No.	Code Word		
<b>Pressure Tank Service</b>						
For 6" Pump.....	6922	VIQCI	6928	VIQDJ	35	\$9.00
For 9" Pump.....	6923	VIQGN	6929	VIQHO	50	11.50
For 12" Pump.....	6924	VIQKR	6930	VIQLS	80	18.00
<b>Open Tank Service</b>						
For 6" Pump.....	6919	VIQEK	6925	VIQFL	35	8.00
For 9" Pump.....	6920	VIQIP	6926	VIQJQ	50	10.50
For 12" Pump.....	6921	VIQMT	6927	VIQNU	80	16.00

### Air Chamber

The Air Chamber is recommended on all installations where the pressure tank is located more than 5 feet away from the pump. It is also recommended on all open tank installations where the discharge pipe is more than 5 feet in length. Its use will eliminate undue water stresses in the system and prevent water hammer. Make the following additions to the prices given when the air chamber is wanted:

Outfit No.		Code Word	Approx. Shpg. Wt., Lbs.	Price
5899	For 6" pump	VILIU	20	\$6.00
6721	For 9" pump	VILJV	50	11.00
5933	For 12" pump	VILKW	85	16.00

### Allowance

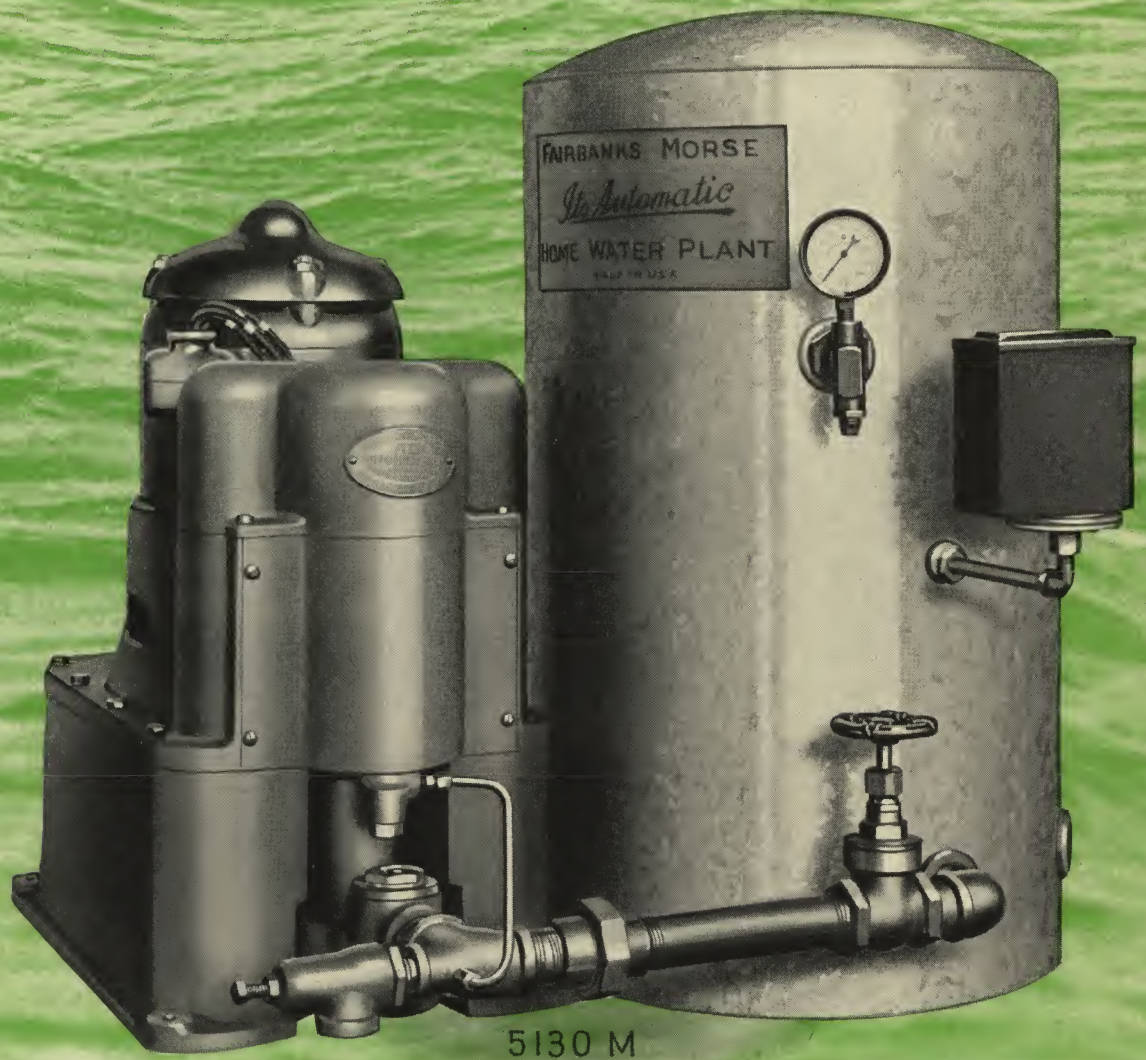
	6" Pump	9" Pump	12" Pump
For Omission of Pulley.....	\$3.55	\$4.65	\$6.00
For Omission of Idler.....	3.80	5.50	7.00
For Omission of Air Chamber (Not required when pump is used for open tank pumping)	4.00	5.00	11.00

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# FAIRBANKS-MORSE

## Type "DC" Water Systems for Deep Wells



Fairbanks-Morse Type "DC", direct connected deep well pumps stand high in the estimation of their many users because of their excellency in design and reliability of performance. Compact—extremely simple—and self-oiling, requiring a minimum of attention. They operate quietly and efficiently. Especially adapted to installations in homes where complete enclosure is required as a protection to children. For construction details see pages following.

Fig. 65. The Type "DC" pump can be furnished complete with pressure tank and accessories as shown in illustration above, or the pump unit can be furnished separately for use in connection with an existing installation.



# Type "DC" Electric Deep Well Water Systems

self-oiling  
fully enclosed  
compact

Direct Connected Electric Motor Drive. Five sizes:  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 2 & 3 horsepower.

For use with Automatic Pressure Tank Systems or for Open Tank Service. Lifts 23 to 300 feet—Capacities 70 to 1430 gallons per hour.

The Type "DC" electrically operated pump illustrated here, is unquestionably one of the highest grade deep well pumps on the market. It is unusually compact in design. Its interior mechanism, as will be noted from the illustrations shown on the next few pages, is a marvel of simplicity. Extra strength and durability characterize every working part.

It is designed for deep well service—for pumping from driven, open or cased wells where the lift from the pump to the water level in the well is in excess of the 22 foot maximum that is obtainable from the shallow well or suction type of pump.

It is especially adaptable for general pumping service on farms, rural estates, plantations, ranches, or for apartment houses, small hotels, mills, factories, country schools and churches, dairies, railroad tanks and stations, roadside filling stations, etc.

## Has Many Desirable Features

The excellent design and sturdy construction of the Type

Fig. 66. The unusual compactness and complete enclosure of the pump unit are clearly illustrated in this view. These desirable and distinguishing features make it particularly adapted to installation in small well pits.



"DC" pump is fully described and clearly displayed on this and the next few pages.

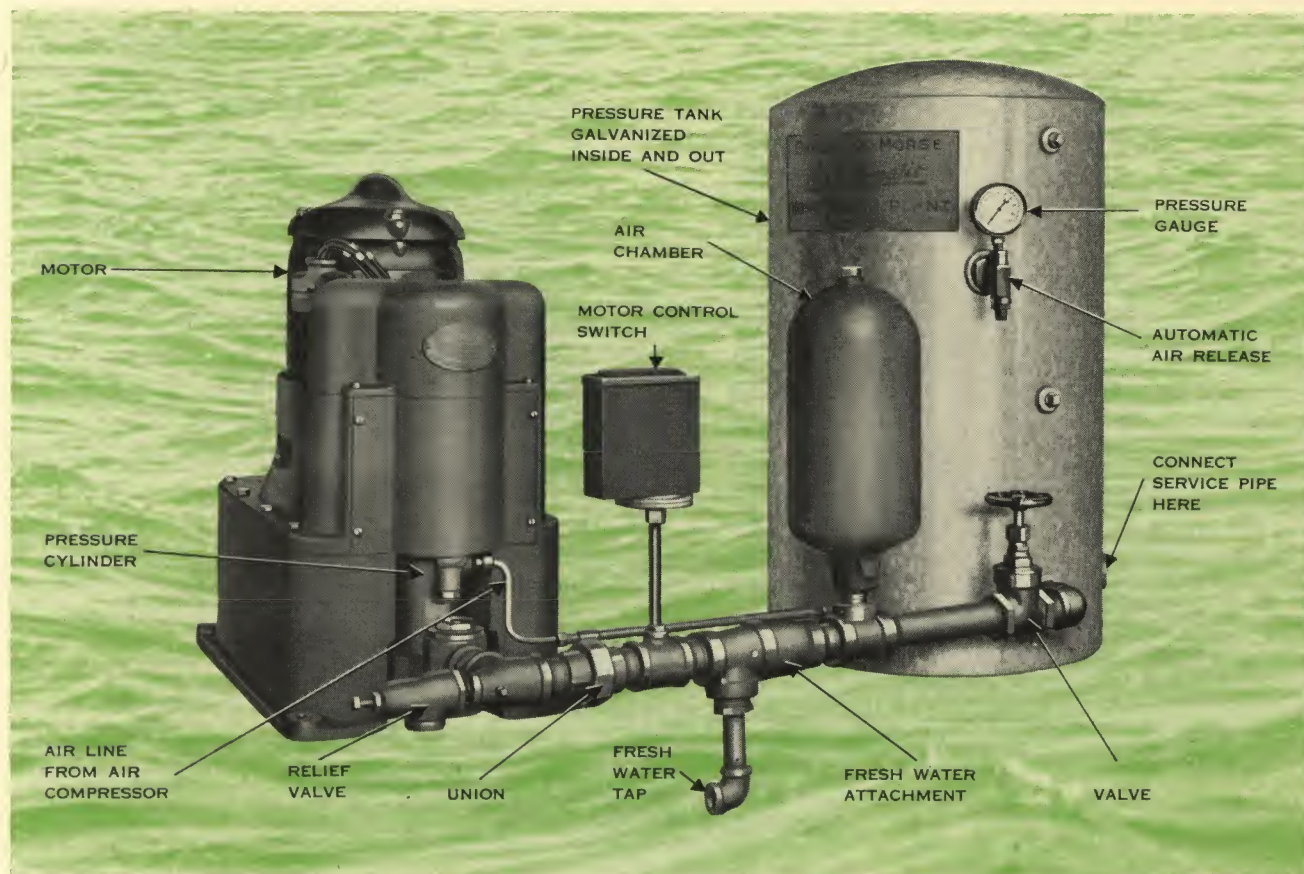
## Sturdily Built Throughout

In any deep well pump, fundamental design is an all-important factor because of the nature of the load the pump has to handle. A pump that is not substantially designed, will not withstand the strain of the continual lifting of the long pump rod and column of water in the drop pipe. A pump that is not properly balanced will be noisy in operation and consequently short-lived. A pump that is not free of lost motion will be complicated in construction and inefficient in operation. A pump that does not have the matter of lubrication carefully and thor-

oughly worked out will be a constant source of annoyance to the owner during its entire period of service because of abnormal wearing of parts.

In all of these details of fundamental and practical design, the Fairbanks-Morse Type "DC" pump adheres to the most modern and approved methods of best engineering practice. The power end consists of a vertical ball bearing motor which is directly connected by means of a flexible coupling to the worm shaft that drives the pump, this type of construction having been chosen because of its quietness of operation. The worm shaft in turn operates in roller bearings, all of the thrust of the assembly falling on the lower worm shaft bearing.





There is no thrust action whatever on the lower bearing of the motor.

### Completely Enclosed

The direct connection thus resulting between the motor and the pump eliminates the necessity for belts or chains in transmitting the power from the motor to the pump. The absence of these parts together with the complete enclosure made possible by the compactness of the design, makes the unit a particularly safe one where there are children around. There is no chance for the curious youngster to become involved in the pump mechanism, in the motor or in the drive because *all* of these moving parts

Fig. 67. The method of connecting the fresh water fitting with its underslung discharge outlet is shown in this illustration of a complete Type "DC" pump installation. When the fresh water valve is used the pressure switch must be moved from the tank to a position in the pipe line on the pump side of the fresh water tap. The air chamber, (required only when the tank is more than 5 feet away from the pump), is also shown in this layout.

are concealed within the trim cast iron housing of the pump.

### Easily Accessible

While the entire working mechanism is completely enclosed, a feature of the design of this unusual pump is the ease with which the working parts may be inspected. All that it is necessary to do is to remove the conveniently located cap screws

that secure the upper housing to the motor base casting. The entire interior mechanism can then be lifted out of the housing base. The motor housing is well ventilated to insure cool operation of this part of the equipment.

### Self-Oiling

The base casting of the pump serves as an oil reservoir. The worm gear, being partly submerged in oil, carries oil to the worm and to the bearings. The cross head guides dip into the oil on the down-stroke and provide lubrication for the guides in the frame. The surplus oil from the guides drains back into the base, lubricating the upper worm bearing on its return. Thus all working parts are oiled automatically when the pump is





Fig. 68. This view shows how the entire operating mechanism is lifted out of the base casting for inspection. Removal of a few cap screws is all that is necessary to gain easy access to the entire interior mechanism.

in operation. The lubrication system is positive in its action—no oil pump to get out of order—no chance for oil to leak out and drip into the well.

### Automatic In Operation Self Starting—Self Stopping

The F-M Type "DC" complete Pressure Tank Systems illustrated on the pages preceding are automatic in operation. They start automatically when the pressure in the tank gets low, and stop automatically when the pressure reaches the maximum of 40 pounds, always keeping the water at suitable pressure for delivery at the faucet.

If it is desired to discharge into an open or overhead tank, however, the pump will be furnished without the air compressor attachment and pressure tank equipment so that its operation may be controlled manually by means of a knife

switch in the line.

Or, if the pump is to be used in connection with an overhead tank and automatic control is desired, an automatic float

switch will be furnished on special order to start the motor when the water level in the tank gets low and to stop it when the water in the tank reaches the desired maximum.

### Quiet In Operation

The pump is quiet in operation. There is no squeaking of dry bearings or joints — no knocking or clanging of loosely fitted parts! The Type "DC" is a pump that can be installed in the basement of the home without fear of annoyance and with absolute confidence that it will perform efficiently and to the complete satisfaction of all concerned.

### Quality Features

The character of design and construction of the Type "DC" pump is apparent upon inspection. The worm and worm shaft are machined from a single piece of special alloy steel. The worm gear is of phos-

Fig. 69. This view, which illustrates the pump with cross head guide cover removed, shows the pressure cylinder with discharge chamber and the air compressor attachment, both of which are driven from the cross head of the pump.

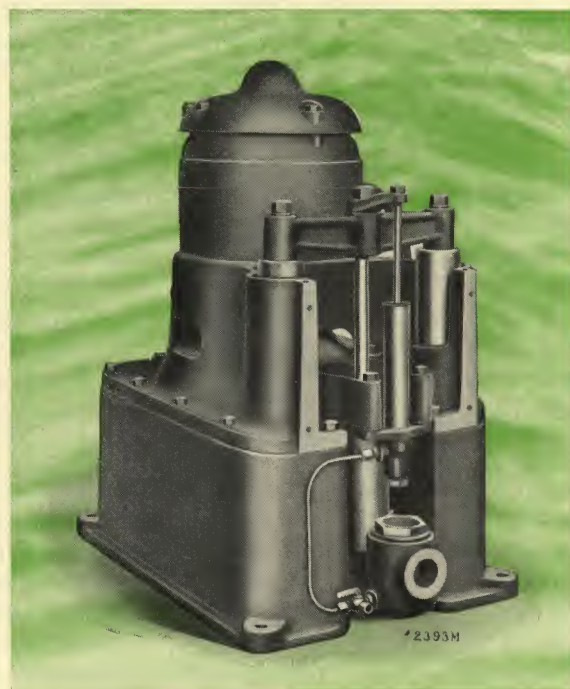


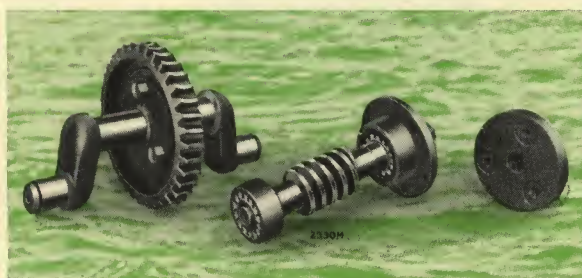




Fig. 70. The extreme simplicity of the design is evident in this view of the drive and bell crank mechanism. Note the unusual sturdy construction throughout.

phor bronze, securely bolted to a flange which is forged as an integral part of the crankshaft.

Fig. 71. The crank-shaft, worm, worm gear and coupling. The worm and worm shaft are machined from a single piece of special alloy steel. In operation this meshes quietly with the machined phosphor bronze worm gear. The worm shaft you will note operates in roller bearings.



### Pressure Cylinder

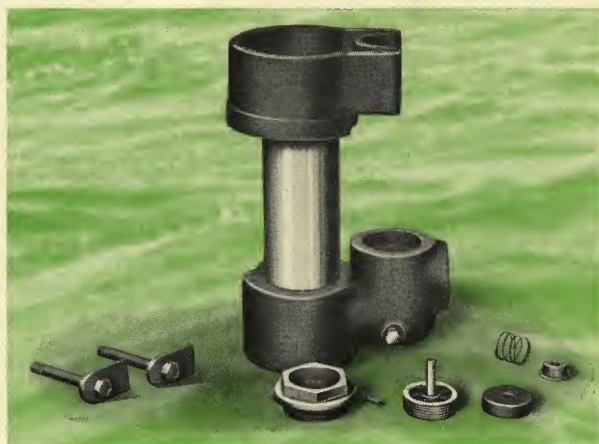
All Type "DC" pumps are fitted with a pressure cylinder having a piston of the double cup leather type. The piston of the pressure cylinder is driven from the cross-head of the pump as shown in Fig. 69.

The pressure cylinder makes possible a division of the load between the up and down strokes of the pump. On the up-stroke the pump lifts the long column of water to the surface. On the down stroke, when the pump would not otherwise be doing any work, the pressure cylinder plunger forces the water—under pressure—from the pressure cylinder, through the discharge valve into the discharge pipe line.

The load on the motor is thus

stroke instead of all of it being done on the up-stroke as would otherwise be the case. This results in smoother and quieter operation of the pump; it also eliminates the extreme momentary overloads on the motor that take place when the entire work

Fig. 72. The pressure cylinder, dismantled. A spring operated valve in the discharge chamber eliminates the necessity of the ordinary check valve in the discharge line.



of lifting and forcing is done on the up-stroke.

### Air Compressor Attachment

On the pumps furnished for pressure tank service the air compressor attachment shown in Fig. 69 provides a simple and efficient means of furnishing the necessary air to the tank. This compressor is driven from the pump cross-head.

### For Pumping Into An Open Tank

Where it is desired to pump into an open or overhead storage tank instead of into a pressure tank all that it is necessary to do is to order the standard pump unit less the air compressor.

### Fresh Water Attachment

With a pressure tank installation, water may be drawn direct from the well for drinking purposes by installing a fresh water attachment which will be furnished with the pump on special order. This inexpensive attachment will start the pump as soon as the drinking water faucet is opened, delivering clear, cold water direct from the well without passing through the storage tank — a convenience greatly appreciated especially on hot days.



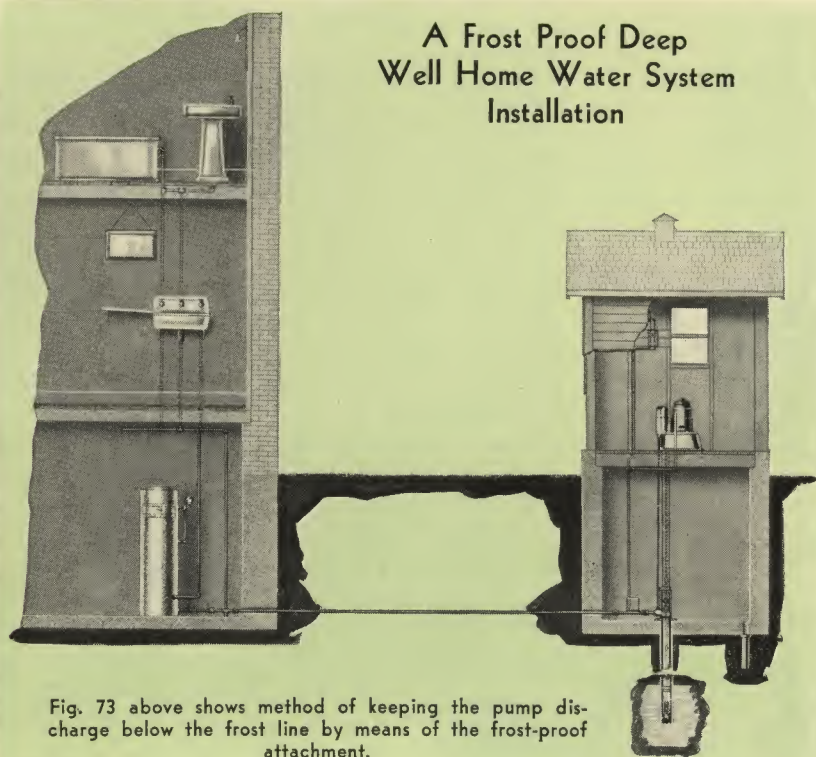


Fig. 73 above shows method of keeping the pump discharge below the frost line by means of the frost-proof attachment.

### Frost Proof Attachment

When the pump is installed in a cold place where there is danger of freezing in the winter time, a frost proof attachment can be ordered which will make it possible for the pump to handle the water without bringing it above the frost line. The anti-freeze or frost proof attachment (shown in Fig. 73) is regularly furnished for a 4½' pit.

The frost proof attachment consists of a heavy drop pipe extension with suitable attachment for supporting the pressure cylinder, a piston rod extension and a well cover to fit over the well casing at the bottom of the pit.

### Air Chamber

In a pressure tank installation where the tank is more than 5 feet away from the pump, or in an open tank installation

where the discharge line is more than 5 feet in length, an air chamber should be installed in the discharge line to provide the necessary air cushion to eliminate water hammer in the line. Suitable air chambers for the various size pumps are available on order.

### Fairbanks-Morse Pumps are Furnished Complete

On the page following is a complete capacity table showing the size pump needed and size pressure cylinder required for various operating conditions. Table No. 1 lists pump units for pressure tank service; Table No. 2 lists pump units for open tank service.

In addition, the various pump units are listed complete (Table 3) with pump-to-tank piping, motor control, storage tank, etc. so that they can be ordered and installed with the minimum

amount of confusion. While only 35 gal. and 70 gal. galvanized tanks are listed here, larger storage tanks are available and can be substituted if desired, at slightly added cost.

### Go To The F-M Dealer

Fairbanks-Morse dealers are experienced water system men. They will be glad to be of assistance in the solution of any water service problem and to recommend the equipment best suited for specific needs.

### Accessories For Type "DC" Pumps (For Prices On The "DC" Pumps, See Next Page)

#### Fresh Water Attachment With Necessary Fittings to Attach

Outfit No.	For Pump Size	Approx. Shipping Weight, Pounds	Cash Selling Price
6783P	¼ HP.	6	\$4.50
6785P	½ HP.	9	6.00
6785P	¾ HP.	9	6.00
6787P	2 HP.	12	13.50
6787P	3 HP.	12	13.50

#### Frost Proof Attachment For 4½' Pit For Pressure Tank Service

Outfit No.	For Pump Size	Approx. Shipping Weight, Pounds	Cash Selling Price
6871	¼ HP.	50	\$13.00
6872	½ HP.	75	16.00
6872	¾ HP.	75	16.00
6873	2 HP.	175	31.00
6873	3 HP.	175	31.00

#### For Open Tank Service

Outfit No.	For Pump Size	Approx. Shipping Weight, Pounds	Cash Selling Price
6868	¼ HP.	50	\$10.50
6869	½ HP.	75	12.75
6869	¾ HP.	75	12.75
6870	2 HP.	175	26.50
6870	3 HP.	175	26.50

#### Air Chamber With Fittings To Attach

Outfit No.	For Pump Size	Approx. Shipping Weight, Pounds	Cash Selling Price
6995	¼ HP.	20	\$4.50
6811	½ HP.	50	5.00
6811	¾ HP.	50	5.00
6812	2 HP.	85	9.50
6812	3 HP.	85	9.50



## CAPACITY PRICE TABLES FAIRBANKS-MORSE TYPE "DC" PUMPS

**TABLE 1** **OUTFITS FOR PRESSURE TANK SERVICE—40 LB. TANK PRESSURE**  
(PIPING AND TANK NOT INCLUDED. SEE TABLE 3 FOR PRICES ON PUMPS COMPLETE WITH PUMP-TO-TANK PIPING AND TANK.)

PUMP UNIT RECOMMENDED													
Gals. per Hour	* Depth to Water in Feet	These Items Furnished when Ordered at Extra Price			Pump Outfit No. (Motor, Pressure Cylinder and Air Compressor)	H.P. of Motor on Pump	Stroke	Size Pressure Cylinder on Pump	Size Tap in Head, Inches		Code Word	Approx. Shipping Weight, Lbs.	Cash Selling Price (See Note A)
		Pump Rod Recom- mended	Well Cylinder Required	Drop Pipe Recom- mended					Drop Pipe	Dis- charge			
70	100	7/16" Steel	1 3/8"	1 1/2"	425-H	1/4	4"	1 5/8"	1 1/2	3/4	VHJAM	215	\$145.00
120	45	7/16" Steel	1 13/16"	2"	425-H	1/4	4"	1 5/8"	2	3/4	VHJBN	215	145.00
85	180	7/16" Steel	1 3/8"	1 1/2"	550-H	1/2	5"	1 5/8"	1 1/2	1	VHJCO	345	170.00
150	110	1 1/8" Wood	1 13/16"	2"	550-B	1/2	5"	2 1/16"	2	1	VHJDP	350	170.00
150	110	7/16" Steel	1 13/16"	2"	550-B	1/2	5"	2 1/16"	2	1	VHJER	350	170.00
230	60	1 1/8" Wood	2 1/4"	2 1/2"	550-B	1/2	5"	2 1/16"	2	1	VHJFS	350	170.00
85	250	7/16" Steel	1 3/8"	1 1/2"	575-H	3/4	5"	1 5/8"	1 1/2	1	VHJGT	355	188.00
150	170	1 1/8" Wood	1 13/16"	2"	575-B	3/4	5"	2 1/16"	2	1	VHJHU	360	188.00
230	100	1 1/8" Wood	2 1/4"	2 1/2"	575-C	3/4	5"	2 1/16"	2 1/2	1	VHJIV	365	188.00
340	50	1 1/8" Wood	2 3/4"	3"	575-C	3/4	5"	2 1/16"	2 1/2	1 1/4	VHJJW	365	188.00
210	300	1 3/8" Wood	1 13/16"	2"	802-B	2	8"	2 1/16"	3	1 1/2	VHJKX	800	365.00
330	200	1 3/8" Wood	2 1/4"	2 1/2"	802-C	2	8"	2 1/16"	3	1 1/2	VHJLY	805	365.00
480	125	1 3/8" Wood	2 3/4"	3"	802-D	2	8"	3"	3	1 1/2	VHJMZ	810	365.00
645	60	1 3/8" Wood	3 1/4"	3 1/2"	802-E	2	8"	3 1/2"	5	2	VHJOA	820	365.00
890	30	1 3/8" Wood	3 3/4"	4"	802-E	2	8"	3 1/2"	5	2	VHJPC	820	365.00
330	300	1 5/8" Wood	2 1/4"	2 1/2"	803-C	3	8"	2 15/32"	3	1 1/2	VHJRD	815	392.00
480	200	1 5/8" Wood	2 3/4"	3"	803-D	3	8"	3"	3	1 1/2	VHJSE	820	392.00
645	120	1 5/8" Wood	3 1/4"	3 1/2"	803-E	3	8"	3 1/2"	5	2	VHJTF	830	392.00
890	90	1 5/8" Wood	3 3/4"	4"	803-E	3	8"	3 1/2"	5	2	VHJUG	830	392.00
1150	65	1 5/8" Wood	4 1/4"	4 1/2"	803-E	3	8"	3 1/2"	5	2	VHJVH	830	392.00

**TABLE 2** **OUTFITS FOR OPEN TANK SERVICE (DISCHARGE AT SERVICE)**  
SAME AS OUTFITS IN TABLE 1 EXCEPT AIR COMPRESSOR OMITTED

70	100	7/16" Steel	1 3/8"	1 1/2"	425-HO	1/4	4"	1 5/8"	1 1/2	3/4	VHKAL	215	\$141.00
120	80	7/16" Wood	1 13/16"	2"	425-BO	1/4	4"	1 5/8"	2	3/4	VHKBM	220	141.00
185	60	1 1/8" Wood	2 1/4"	2 1/2"	425-BO	1/4	4"	2 1/16"	2	3/4	VHKCN	220	141.00
85	180	7/16" Steel	1 3/8"	1 1/2"	550-HO	1/2	5"	1 5/8"	1 1/2	1	VHKDO	345	164.00
150	150	1 1/8" Wood	1 13/16"	2"	550-BO	1/2	5"	2 1/16"	2	1	VHKEP	350	164.00
230	120	1 1/8" Wood	2 1/4"	2 1/2"	550-CO	1/2	5"	2 15/32"	2 1/2	1 1/4	VHKFR	355	164.00
340	80	1 1/8" Wood	2 3/4"	3"	550-CO	1/2	5"	2 15/32"	2 1/2	1 1/4	VHKGS	355	164.00
85	250	7/16" Steel	1 3/8"	1 1/2"	575-HO	3/4	5"	1 5/8"	1 1/2	1	VHKHT	355	182.00
150	210	1 1/8" Wood	1 13/16"	2"	575-EO	3/4	5"	2 1/16"	2	1	VHKIU	360	182.00
230	160	1 1/8" Wood	2 1/4"	2 1/2"	575-CO	3/4	5"	2 15/32"	2 1/2	1 1/4	VHKJV	365	182.00
340	110	1 1/8" Wood	2 3/4"	3"	575-DO	3/4	5"	3 1/16"	3	1 1/4	VHKKW	370	182.00
480	75	1 1/8" Wood	3 1/4"	3 1/2"	575-DO	3/4	5"	3 1/16"	3	1 1/4	VHKLX	370	182.00
210	300	1 3/8" Wood	2 13/16"	2"	802-BO	2	8"	2 1/16"	3	1 1/2	VHKMY	800	357.00
330	220	1 3/8" Wood	2 13/16"	2 1/2"	802-CO	2	8"	2 15/32"	3	1 1/2	VHKNZ	805	357.00
480	160	1 3/8" Wood	2 3/4"	3"	802-DO	2	8"	3"	3	1 1/2	VHKOB	810	357.00
645	120	1 3/8" Wood	3 1/4"	3 1/2"	802-EO	2	8"	3 1/2"	5	2	VHKPA	820	357.00
890	90	1 3/8" Wood	3 3/4"	4"	802-FO	2	8"	4"	5	2	VHKRC	825	357.00
1150	70	1 3/8" Wood	4 1/4"	4 1/2"	802-FO	2	8"	4"	5	2	VHKSD	825	357.00
330	300	1 3/8" Wood	2 1/4"	2 1/2"	803-CO	3	8"	2 15/32"	3	1 1/2	VHKTE	815	384.00
480	220	1 3/8" Wood	2 1/4"	3"	803-DO	3	8"	3"	3	1 1/2	VHKUF	820	384.00
645	175	1 3/8" Wood	3 1/4"	3 1/2"	803-EO	3	8"	3 1/2"	5	2	VHKVG	830	384.00
890	130	1 3/8" Wood	3 3/4"	4"	803-FO	3	8"	4"	5	2	VHKWH	835	384.00
1150	105	1 3/8" Wood	4 1/4"	4 1/2"	803-FO	3	8"	4"	5	2	VHKXI	835	384.00
1430	85	1 3/8" Wood	4 3/4"	5"	803-FO	3	8"	4"	5	2	VHKYJ	835	384.00

\*The depth specified is the maximum allowable distance from the surface of the ground to the lowest water level in the well while the pump is operating. In addition to lifting the water this distance, the pressure tank outfits will force it into a pressure tank against 40-lbs. maximum pressure. The capacities in the open tank section are computed for discharge at the surface of the ground.

**NOTE A:**—Prices of the pump unit given in this column cover the pump with 110-volt, 60 cycle, single phase motor, pressure cylinder as specified and (in the case of the pressure tank outfits only), air compressor. Well cylinder, pump rod and drop pipe, piping package and tank are not included. (See Table 3 below for prices on tank and piping packages). Direct current or special cycle motors are available at the following increase in list price:

32 volt direct current.....	1/4-HP	1/2-HP	3/4-HP	25 cycle single phase 110-220 volts.....	1/4-HP	1/2-HP	3/4-HP	2-HP	3-HP
110 volt direct current.....	\$4.00	\$6.00	\$8.00	30 cycle single phase 110-220 volts.....	\$10.00	\$15.00	\$16.00	\$20.00	\$25.00
220 volt direct current.....	4.00	6.00	8.00	50 cycle single phase 110-220 volts.....	0	0	0	0	0

**TABLE 3** **PRESSURE TANK UNITS COMPLETE WITH PUMP-TO-TANK PIPING AND GALV. PRESSURE TANK**

	1/4 H.P.			1/2 H.P.			3/4 H.P.			2 H.P.			3 H.P.		
	Out-fit No.	Shpg. Wt. Lbs.	Price	Out-fit No.	Shpg. Wt. Lbs.	Price	Out-fit No.	Shpg. Wt. Lbs.	Price	Out-fit No.	Shpg. Wt. Lbs.	Price	Out-fit No.	Shpg. Wt. Lbs.	Price
PUMP UNIT (Table 1)...	425H	215	\$145.00	550H	345	\$170.00	575H	360	\$188.00	802B	810	\$365.00	803C	820	\$392.00
**PIPING PACKAGE.....	6991	20	19.50	6999	25	22.50	6999	25	22.50	7003	30	30.00	7003	30	30.00
35 GAL. GALV. TANK...	5476	75	16.00	5476	75	16.00	5476	75	16.00	5476	75	16.00	5476	75	16.00
*OUTFIT COMPLETE: With 35 Gal. Tank.....	425H-35	310	180.50	550H-35	445	208.50	575H-35	460	226.50	802B-35	915	411.00	803C-35	925	438.00
With 70 Gal. Tank.....	425H-70	345	189.00	550H-70	480	217.00	575H-70	495	235.00	802B-70	950	419.50	803C-70	960	446.50

\*When ordering complete outfits by outfit number, be sure the letter in the outfit number correctly indicates the size of pressure cylinder desired. Get from Table No. 1.

**TANKS:**—Generally speaking, it is not considered good practice to use a tank smaller than the 70 gal. size with outfits 3/4 H.P. and larger. Be sure to install a tank large enough to give the desired storage capacity. Prices on larger tanks, 120 gals. to 4000 gals. capacity will be found on special tank price page.

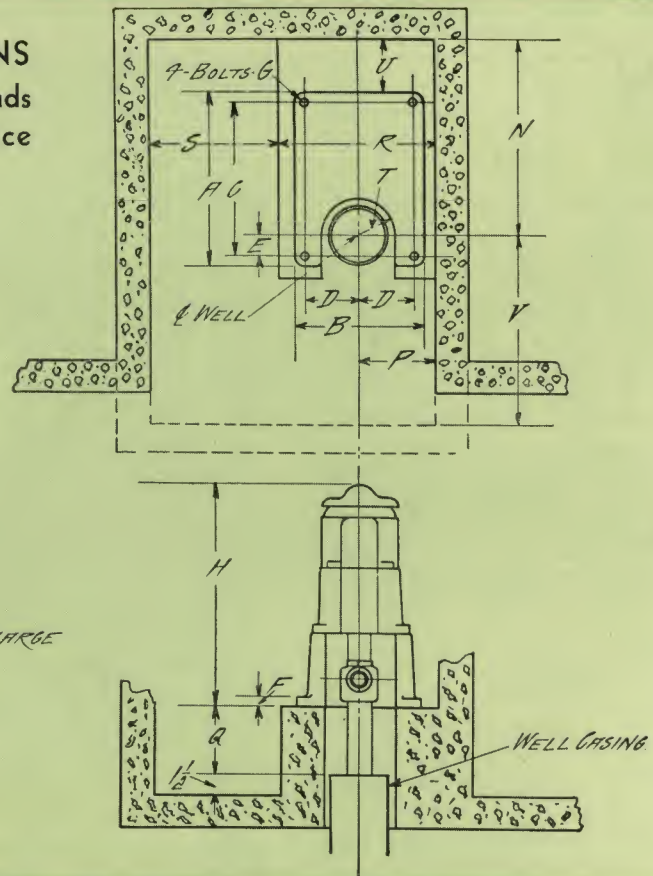
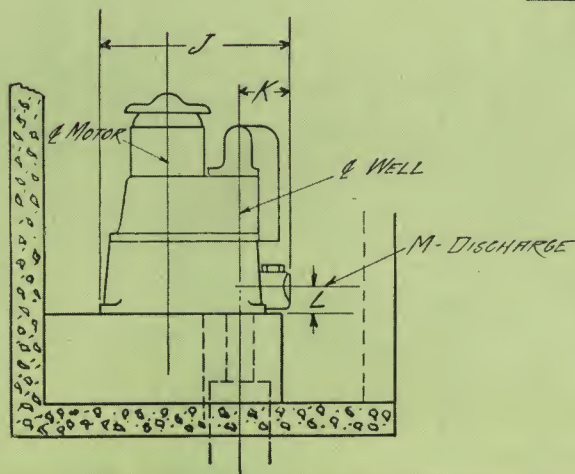
**\*\*PIPING PACKAGE:**—The equipment included in the standard piping package consists of:

1. Pressure switch
2. Air control for tank
3. Pressure gauge
4. Globe valve
5. Relief valve in pipe line
6. Necessary union, ell, nipples to complete pump-to-tank connections as illustrated



# FOUNDATION DIMENSIONS Type "DC" Motor Driven Heads Open or Pressure Tank Service

▼ ▼ ▼



PRINCIPAL DIMENSIONS OF TYPE "DC" DEEP WELL PUMPS

H.P. of Head	A	B	C	D	E	F	G	H	J	K	L
1/4	15 1/4	11 1/2	14	5 3/8	1 3/8	3/4	3/8	20 3/8	17 3/8	4 3/8	2 1/2
1/2	19	13 1/2	17 1/2	6	2 1/8	3/8	1/2	24 3/8	20 3/8	4 3/4	2 3/8
3/4	19	13 1/2	17 1/2	6	2 1/8	3/8	1/2	24 3/8	21 3/4	5 3/8	2 3/8
2	27	20	25 1/2	9 1/4	3 3/8	3/8	1/2	35 1/4	30 1/8	7 1/2	3 3/8
3	27	20	25 1/2	9 1/4	3 3/8	3/8	1/2	35 1/4	30 1/8	7 1/2	3 3/8

INSTALLATION DIMENSIONS AND MINIMUM CLEARANCES TO ALLOW

H.P. of Head	Size Press. Cyl.	Size Well Cyl.	M	N Not Less	P	Q Not Less	R	S Not Less	T	U Not Less	V	Based on Maximum Size of Casing
1/4	1 3/8	1 3/8	3/4	18 1/4	7 1/4	0	14 1/2	12	3 1/2	6	28	6
1/4	2 1/16	1 13/16	3/4	18 1/4	7 1/4	0	14 1/2	12	3 1/2	6	28	6
1/4	2 1/16	2 1/4	3/4	18 1/4	7 1/4	7	14 1/2	12	3 1/2	6	28	6
1/4	1 3/8	1 13/16	3/4	18 1/4	7 1/4	7	14 1/2	12	3 1/2	6	28	6
1/2 or 3/4	1 3/8	1 3/8	1	23 1/8	8 1/4	0	16 1/2	12	3 1/2	7	28	6
1/2 or 3/4	2 1/16	1 13/16	1	23 1/8	8 1/4	0	16 1/2	12	3 1/2	7	28	6
1/2 or 3/4	2 15/32	2 1/4	1	23 1/8	8 1/4	0	16 1/2	12	3 1/2	7	28	6
1/2 or 3/4	2 15/32	2 3/4	1 1/4	23 1/8	8 1/4	7	16 1/2	12	3 1/2	7	28	6
1/2 or 3/4	2 1/16	2 1/4	1	23 1/8	8 1/4	7	16 1/2	12	3 1/2	7	28	6
3/4	3 1/16	2 3/4	1 1/4	23 1/8	8 1/4	0	16 1/2	12	3 1/2	7	30	6
3/4	3 1/16	3 1/4	1 1/4	23 1/8	8 1/4	7	16 1/2	12	3 1/2	7	30	6
3/4	2 15/32	2 3/4	1 1/4	23 1/8	8 1/4	7	16 1/2	12	3 1/2	7	30	6
2 or 3	2 1/16	1 13/16	1 1/2	31 5/8	11 1/2	2 1/2	23	16	4	9	32	7
2 or 3	2 15/32	2 1/4	1 1/2	31 5/8	11 1/2	2 1/2	23	16	4	9	32	7
2 or 3	3	2 3/4	1 1/2	31 5/8	11 1/2	2 1/2	23	16	4	9	32	7
2 or 3	3 1/2	3 1/4	2	31 5/8	11 1/2	4 1/2	23	16	4	9	32	7
2 or 3	4	3 3/4	2	31 5/8	11 1/2	4 1/2	23	16	4	9	32	7
2 or 3	4	4 1/4	2	31 5/8	11 1/2	4 1/2	23	16	4	9	32	7
2 or 3	3 1/2	3 3/4	2	31 5/8	11 1/2	4 1/2	23	16	4	9	32	7
3	4	4 3/4	2	31 5/8	11 1/2	4 1/2	23	16	4	9	32	7



# Fairbanks-Morse Model "A" Self-Oiling Pump Jacks

▼ ▼ ▼  
Electric, Engine Driven or  
Belted.

Stroke . . . Adjustable, 6" or 8"  
Gear Reduction . . . 5 1/2 to 1  
Maximum Operating Speed, 35  
strokes per minute.

Depth . . . Can be used on wells  
up to 292 feet.

▼ ▼ ▼  
The Fairbanks-Morse Model  
"A" Pump Jack is offered for  
those cases where an inexpen-  
sive well-made jack of modern  
design is desired for pumping  
from wells where the water lev-  
el is lower than 22 feet from  
the surface of the ground.

## Double Geared Type

It is of the double geared  
type, the gears being of mould-  
ed construction to insure a hard,  
smooth, long-life wearing sur-  
face.

## Self-Oiling

The entire mechanism oper-  
ates in a bath of oil.

The housing or main frame  
casting encloses all working  
parts, making it impossible for

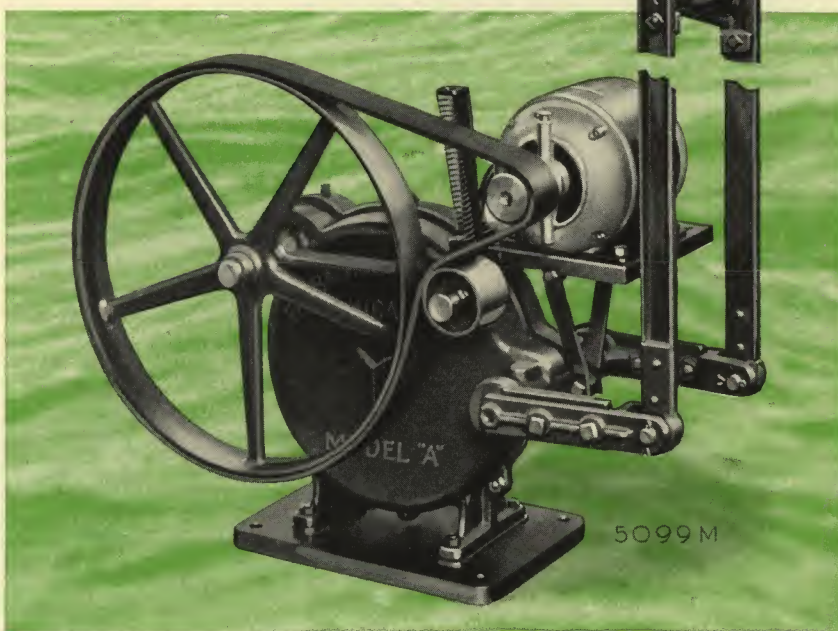


Fig. 81. Outfits No. 6910, 6911, 6912. Model "A" Electric Pump Jacks equipped with Fairbanks-Morse Motor.

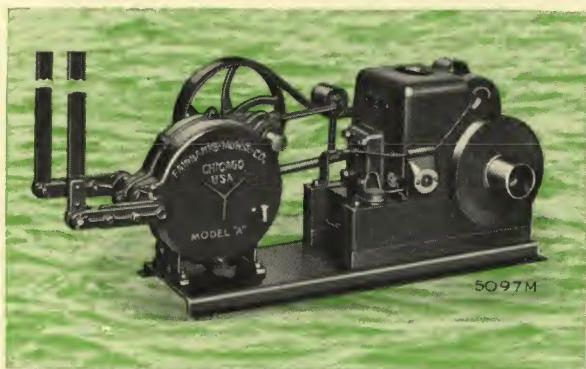
dirt, sleet, snow and water to get  
into the oil as is apt to happen  
with the ordinary open end  
jack. Thus not only is the pos-  
sibility of lubrication dilution  
eliminated but also there is no  
chance for the oil to overflow  
and escape from the housing

and drip into the well.

The two halves of the main  
frame casting are ground, lined-  
up with machine precision and  
bolted together. A special  
automotive preparation called  
"Form-A-Gasket" is applied be-  
tween the adjoining surfaces to  
prevent oil leakage.

## Interior Mechanism

A hardened steel roller, con-  
nected to the large main gears  
by means of a cold rolled steel  
pin, operates in a slotted lever  
which in turn is keyed on a  
hinged cold rolled steel pin to  
which the connecting links to  
the pitman are keyed. Com-  
plete enclosure is thus obtained  
and, in addition, the movement  
gives a long leverage or slow



▼ ▼ ▼  
Fig. 82. Outfit No. 6913  
shown here is close-  
belted by means of a  
corded rubber belt and  
idler to a 1 1/2 H.P. F-M  
self-oiling "Z" engine,  
the complete assembly  
being mounted on a sub-  
stantial formed steel  
base. Neat—depend-  
able—easy starting.



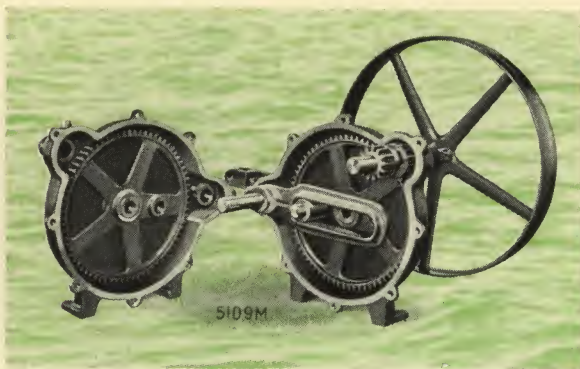


Fig. 83. Showing the double gear drive and interior mechanism of the F-M Model "A" Self-oiling Pump Jack.

trically operated or engine driven jack is required, the usual Fairbanks - Morse guaranty of undivided responsibility prevails.

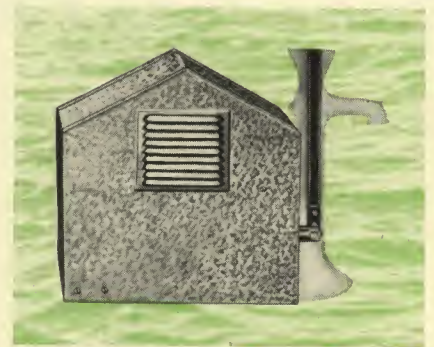


Fig. 84. Outfit No. 6916. The galvanized sheet steel housing illustrated here can be furnished to protect the motor and belt from rain, snow, sleet, etc. Shipped "knocked-down." Easily assembled.

movement on the lifting stroke and a short leverage or quick turn on the down stroke. The efficiency of the jack is thus greatly improved and this construction contributes greatly to its easy starting feature.

Pitmans of channel steel construction with iron cross-head

are standard equipment and shipped with all jacks.

### One Undivided Responsibility

Both the motors and the engines used on these outfits are built by Fairbanks-Morse, so regardless of whether an elec-

### MODEL "A" ELECTRIC JACKS--PRICES AND CAPACITIES

Prices cover the Jack completely assembled with Fairbanks-Morse single phase, repulsion, 60 cycle Motor, 18" Pulley on Jack, Idler and Belt. No Pump Standard, Well Cylinder or Pump Rod included.

H.P. of Motor	6" Stroke				8" Stroke				Outfit No.	Code Word	Approx. Shpg. Weight, Lbs.	Price
	Diameter Well Cylinder	G.P.H. at 35 Strokes per Min.	Max. Lift in Feet		Diam. Well Cylinder	G.P.H. at 35 Strokes per Min.	Max. Lift in Feet					
			Open Tank	Pressure Tank (40 lbs. pressure)			Open Tank	Pressure Tank (40 lbs. pressure)				
1/8	1 13/16"	125	202	110	1 13/16"	170	152	60	6910	VJCAW	150	\$60.00
	2"	155	157	65	2"	205	118	26				
	2 1/4"	195	117	25								
1/2	1 13/16"	125	282	190	1 13/16"	170	232	140	6911	VJCDZ	185	70.00
	2"	155	242	150	2"	205	182	90				
	2 1/4"	195	187	95	2 1/4"	260	137	45				
	2 1/2"	240	147	55								
	2 3/4"	290	117	25								
3/4	2"	155	292	200	2"	205	242	150	6912	VJCHD	210	82.00
	2 1/4"	195	282	190	2 1/4"	260	217	125				
	2 1/2"	240	232	140	2 1/2"	320	172	80				
	2 3/4"	290	192	100	2 3/4"	390	142	50				
	3"	350	157	65	3"	450	118	26				

### ENGINE DRIVEN JACKS--PRICES AND CAPACITIES

Prices cover the Jack completely assembled on formed steel base with Fairbanks-Morse "Z" Engine, 12" Pulley on Jack, Idler and Belt. No Pump Standard, Well Cylinder or Pump Rod included.

H.P. of Engine	6" Stroke				8" Stroke				Outfit No.	Code Word	Approx. Shpg. Weight, Lbs.	Price
	Diameter Well Cylinder	G.P.H. at 35 Strokes per Min.	Max. Lift in Feet		Diam. Well Cylinder	G.P.H. at 35 Strokes per Min.	Max. Lift in Feet					
			Open Tank	Pressure Tank (40 lbs. pressure)			Open Tank	Pressure Tank (40 lbs. pressure)				
1 1/2	2"	155	292	200	2"	205	242	150	6913	VJCKG	385	\$99.50
	2 1/4"	195	282	190	2 1/4"	260	217	125				
	2 1/2"	240	232	140	2 1/2"	320	172	80				
	2 3/4"	290	192	100	2 3/4"	390	142	50				
	3"	350	157	65	3"	450	118	26				

### PRICES ON BELTED JACKS

Prices include jack only with pulley for belted service—no base or belt tightening idler.

Description	Outfit No.	Code Word	Wgt., Lbs.	Price
Jack with 12" pulley for engine drive.	6914	VJCNJ	110	\$20.00
Jack with 18" pulley for motor drive.	6915	VJCNR	115	21.50

### PRICES ON ACCESSORIES

Equipment	Outfit No.	Wgt., Lbs.	Price
Galvanized sheet steel housing for motor driven assemblies.....	6916	25	\$7.00
Replacement belt for either motor or engine driven jacks. 66"x2" two-ply special Kable Kord.....	6985	.....	3.00



## Why F-M Engine Driven Water Systems Are Easy To Start

An engine may have everything else—but without a reliable ignition system it cannot be dependable. The *vital* spot of any gasoline engine is the magneto.

Recognizing that the best magneto for a small internal combustion engine is one that produces a spark with the *most* heat for ignition, Fairbanks-

ways necessary in connection with an engine operated system because of the difficulty in getting the engine in operation. This, however, does not apply to Fairbanks-Morse engine operated systems. You may use a tank as small as 220 gallons capacity if you desire, to keep the cost at a minimum because the engine is not temperamental

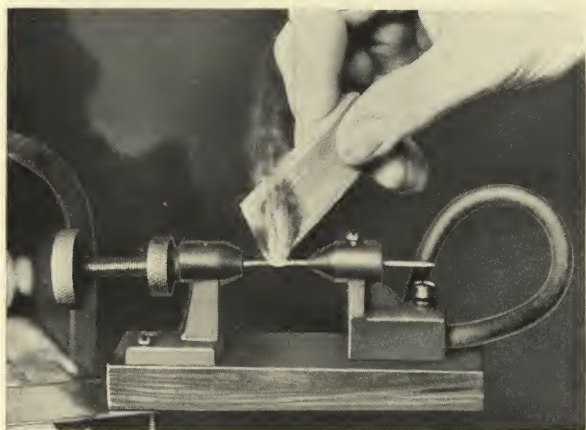


Fig. 92. This test demonstrates the heat of the flaming spark of the Type "R" Magneto. A block of wood held in the spark gap quickly catches fire

Morse builds within their own factories the Type "R" Rotary High Tension Magneto shown here for the "Z" Engine. The hot, flaming spark that it delivers ignites the fuel quickly. That is why the "Z" Engine driven water systems — both shallow and deep well types— are so easy to start.

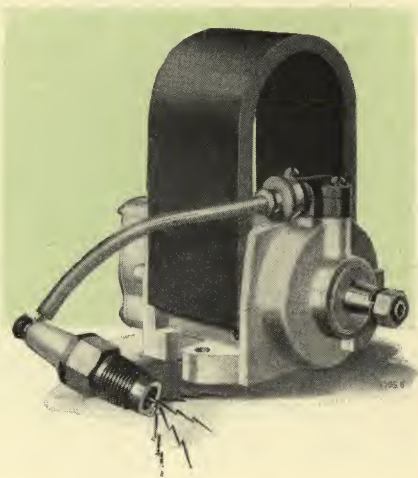
The "Z" used on all F-M engine operated water systems has the reputation of being the easiest starting engine on the market. It has been a more or less general opinion in the past that a large storage tank is al-

—it is always ready to start.

The Type "R" Magneto has many other features. It is self-oiling; completely enclosed and sealed; dust-proof; water-proof, oil-proof, rust-proof. It is equipped with long-life breaker points; a large magnet insuring a hotter and more intense

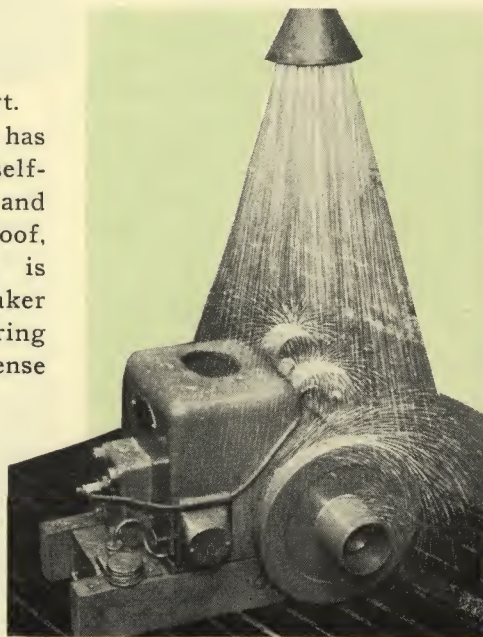
Fig. 93. After 125 hours under a drenching shower—a flip of the crank and the "Z" started easily, instantly. What better proof that a "Z" Engine operated water system can be started easily.

Fig. 91. The Type "R" Rotary High Tension Magneto shown below is regular equipment at no extra price on all F-M engine operated water systems—both shallow and deep well types.



spark; and an unusually large armature, making possible a hot spark at low cranking speed.

As a result of the excellent performance of this magneto in the field the Type "R" magneto has won its right to the strong F-M guaranty behind it.





## Undivided Responsibility ---an Undivided Guaranty

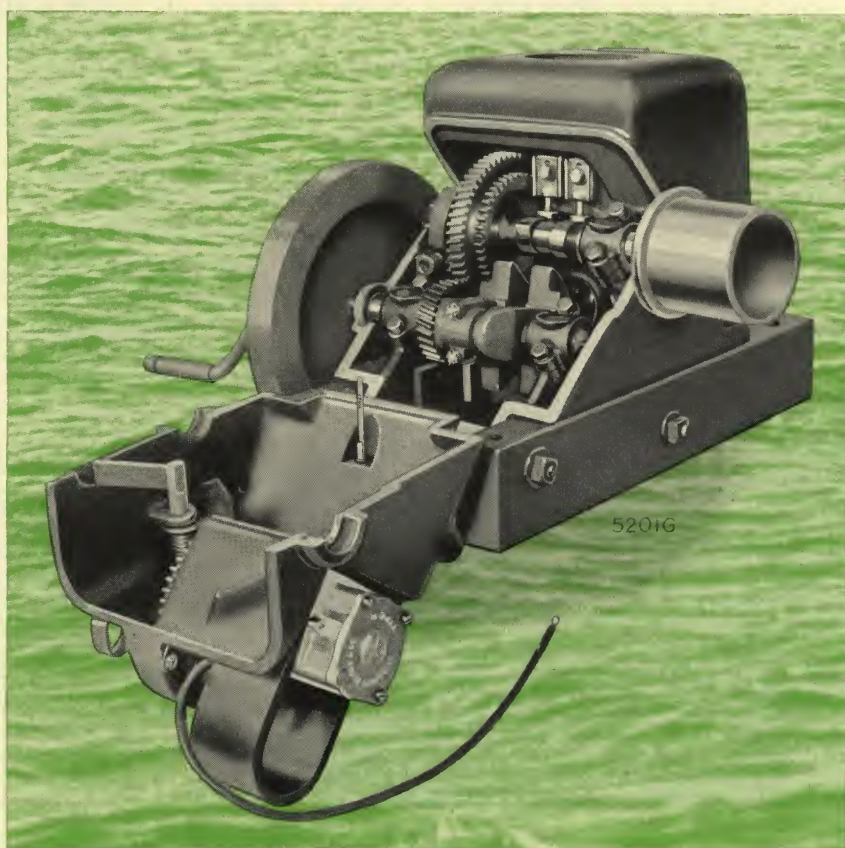
Too much emphasis cannot be placed on the fact that Fairbanks-Morse Home Water Systems are designed, completely manufactured and sold by a single organization—Fairbanks, Morse & Co.! To the prospective purchaser of a home water system, this undivided responsibility is a telling sales point if properly analyzed and presented.

Contrary to the manufacturing policy of many companies, all models and types of Fairbanks-Morse Home Water Systems, whether engine or electric motor driven, shallow or deep well, are made *completely* by the same organization; that is, no essential part is "farmed out" or purchased. The motor or engine, the pump, the automatic control mechanism and tank can thus be designed at the outset as a *balanced* unit without compromises usually found in "assembled" mechanisms.

Following this inherent advantage of undivided design comes undivided manufacture. The quality of manufacture of each integral part is under the complete control and supervision of the same organization responsible for the completed system.

And then finally to the complete assembly and inspections: Here, the manufacturing divisions responsible for the individual mechanisms are faced squarely with the test of quality. Failure to come up to the required standard can be instantly rectified. There is no lack of ability nor is there the temptation to "let it pass" due to a remote source of supply for any individual part.

Fig. 88. Over 650,000 Fairbanks-Morse "Z" engines are in use, many of them operating F-M Home Water Systems. The illustration below shows the interior mechanism of the 1½ H.P. "Z."



Let us consider the power plant for the water system for the moment—in this first case, the famous "Z" Engine drive. Back in 1894—two years before the first automobile engine was built—Fairbanks-Morse began the manufacture of gasoline engines. Later when rising prices of gasoline raised operating expense, thousands of power users turned to F-M engines which burned kerosene. Then came this company's pioneering in the field of Diesel Engines of which more than 2,750,000 horsepower are now in service bearing the Fairbanks-Morse name.

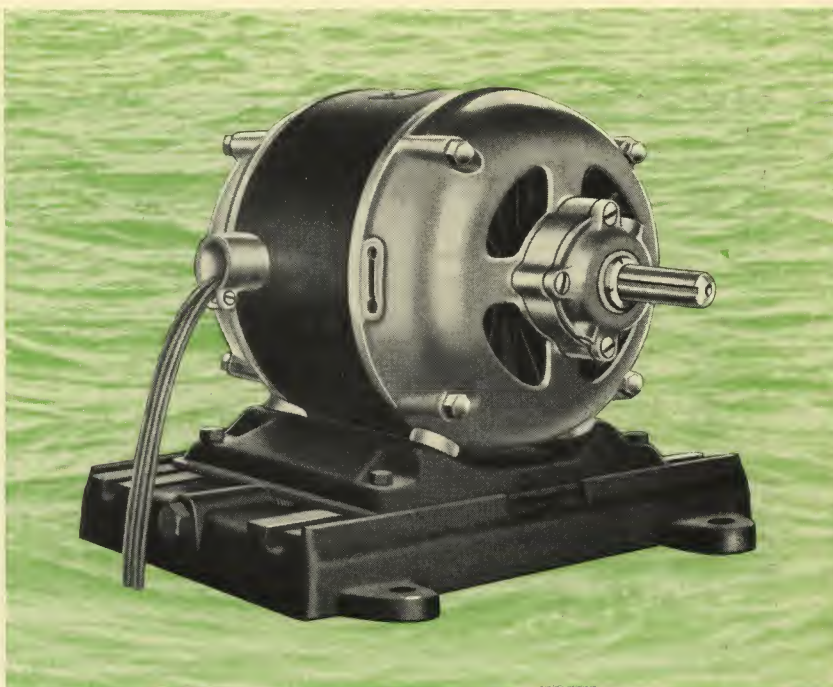
It is safe to say that in America today there is no single organization with longer or more complete experience in the field of internal combustion engine manufacturing than Fairbanks-Morse. The same engineers and manufacturing organization responsible for the development and manufacture of engines large enough to furnish light and power to a city, also manufacture the engine which drives the F-M Home Water System.

Now let us consider the electrically driven F-M Home Water System—and its electric mo-



tor. It is but natural that this company should rank high among the leading builders of electric motors. Again, a pioneer in this field, Fairbanks-Morse has been an important factor in the development of this important source of power. First to see the advantages of anti-friction bearings, this company pioneered the ball-bearing motor. Today the F-M Electric Motor found in the F-M Home Water System is but a smaller counterpart of motors up to 1200 horsepower and more which are furnishing power for gigantic industrial enterprises—and both are the product of equal care.

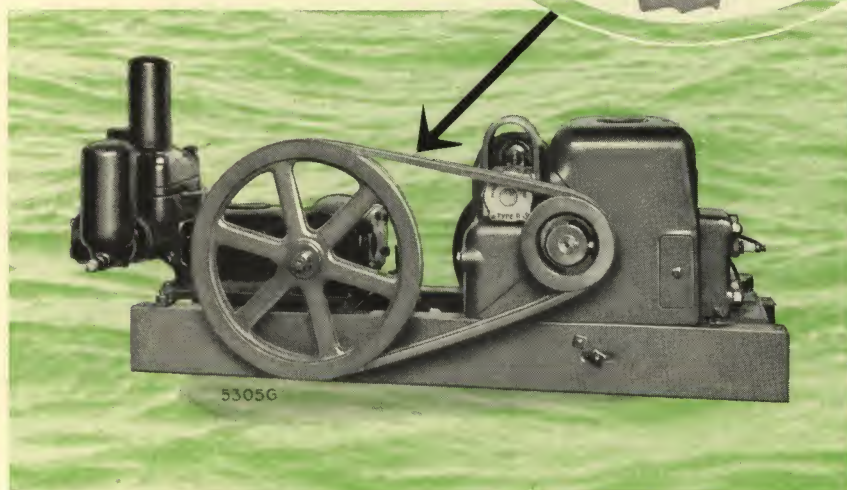
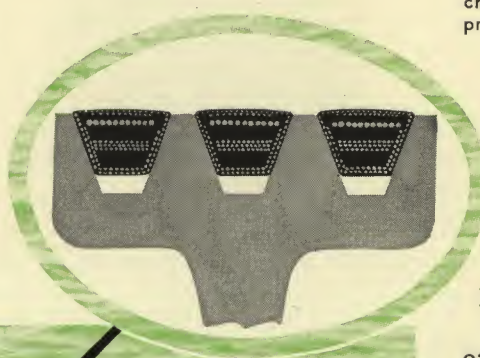
Having considered the source of power, now let us consider the means by which this power is brought to the pump—the transmission. Fairbanks-Morse perfected the now famous Flex-Mor Drive, an illustration of which appears on this page. The Flex-Mor is a drive that permits of a more compact arrangement of the entire system due to its ability to operate on short centers; it is a drive



that is silent — requires no dressing. It is the most efficient belt drive that engineer-

Fig. 89. Fairbanks-Morse motors meet the most exacting electrical specifications. And with characteristic thoroughness, the mechanical design incorporates many improved construction features to give longer, trouble-free service.

Fig. 90. The Flex-Mor "V" belt drive made by Fairbanks-Morse and used on F-M Water Systems is one of the best drives on the market. Illustration at right shows cross sectional view of a 3 belt Flex-Mor.



ing skill has yet devised. Careful alignment and vibration reduced to the lowest possible minimum are also large factors in the longer service life of F-M Home Water Systems.

Now for the pump unit. In other pages in this book appears a complete story of Fairbanks-Morse Pumps. From a large city's pumping requirements to the relatively smaller needs of a single home is a long step. Fairbanks-Morse Pumps serve both and from the standpoint of need for reliable service, this company recognizes both as equally important. No better pumps are made.

Undivided responsibility means an undivided guaranty and no passing on of responsibility under that guaranty!

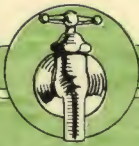




Back of the product, back of the dealer and back of the branch house is the Fairbanks-Morse guaranty. It is as brief as it is strong: "If any part of any Fairbanks-Morse Product fails because of defect this part will be replaced without charge, f. o. b. factory, upon return, transportation prepaid, of the defective part to the factory."

To those who have had dealings with the company at some time or other during the past seventy-five years, the spirit of the guaranty is well known. To these satisfied users the Fairbanks-Morse nameplate is symbolic of the best quality that money can buy.





**ACCESSORIES**  
For  
**Fairbanks-Morse**  
**Home Water Systems**



Cylinders  
Pump Rod : Rod Couplings  
Valves : Air Chambers  
Pressure Tanks : Septic Tanks  
Relief Valves : Air Controls  
Electric Motors







ABOVE:—FIG. 454-Y  
ALL BRASS CYLINDER

### No. 454-Y ALL BRASS CYLINDERS

SPRING VALVE, OPEN TOP, FOR DEEP WELLS  
Suitable for Types "B", "C" or "DC" Deep Well Pumps

Inside Diam., Inches	*Length of Stroke, Inches	Length Overall, Inches	Outside Diameter of Coupling, Inches	Drop Pipe Recommended, Inches	Unless otherwise specified tapping indicated by heavy type will be furnished. Plunger Tapped For	Outfit No.	Approx. Shpg. Weight, Pounds	Price F.O.B. Chicago
1 3/8	10	20 7/16	2 3/16	1 1/2	5/8" Rod or 3/8" Pipe	5953	9	\$ 5.80
1 3/8	14	24 7/16	2 3/16	1 1/2	"	5953A	11	6.50
1 3/8	16	26 7/16	2 3/16	1 1/2	"	5953B	12	7.25
1 13/16	10	20 11/16	2 11/16	2	"	5954	11	6.60
1 13/16	14	24 11/16	2 11/16	2	"	5954A	12	7.25
1 13/16	16	26 11/16	2 11/16	2	"	5954B	13	8.00
2 1/4	10	21	3 5/16	2 1/2	"	5955	15	10.40
2 1/4	14	25	3 5/16	2 1/2	"	5955A	17	11.20
2 1/4	16	27	3 5/16	2 1/2	"	5955B	18	12.00
2 3/4	10	22 3/16	3 7/8	3	"	5956	17	14.50
2 3/4	14	26 3/16	3 7/8	3	"	5956A	19	15.60
2 3/4	16	28 3/16	3 7/8	3	"	5956B	20	16.75

### No. 456-Y BRASS LINED CYLINDERS

SPRING VALVE, FOR DEEP WELLS  
Suitable for Types "B", "C" or "DC" Deep Well Pumps



ABOVE:—FIG. 456-Y  
BRASS LINED CYLINDER  
(See Note Below)

1 13/16	10	18	2 11/16	2	5/8" Rod or 3/8" Pipe	5957	10	\$ 6.75
1 13/16	14	22	2 11/16	2	"	5958	12	7.50
1 13/16	18	26	2 11/16	2	"	5959	14	8.25
1 13/16	28	36	2 11/16	2	"	5960	18	10.50
2 1/4	10	20	3 5/16	2 1/2	"	5961	16	10.25
2 1/4	14	24	3 5/16	2 1/2	"	5962	18	11.25
2 1/4	18	28	3 5/16	2 1/2	"	5963	21	12.75
2 1/4	28	38	3 5/16	2 1/2	"	5964	25	15.75
2 3/4	10	21	3 7/8	3	"	5965	25	12.50
2 3/4	14	25	3 7/8	3	"	5966	27	14.25
2 3/4	18	29	3 7/8	3	"	5967	32	15.75
2 3/4	28	39	3 7/8	3	"	5968	40	19.50
3 1/4	10	22	4 9/16	3 1/2	7/8" Rod or 1/2" Pipe	5969	31	16.50
3 1/4	14	26	4 9/16	3 1/2	"	5970	36	18.50
3 1/4	18	30	4 9/16	3 1/2	"	5971	39	20.50
3 1/4	28	40	4 9/16	3 1/2	"	5972	50	25.00
3 3/4	10	22	5 1/8	4	"	5973	38	21.00
3 3/4	14	26	5 1/8	4	"	5974	44	22.50
3 3/4	18	30	5 1/8	4	"	5975	48	25.00
3 3/4	28	40	5 1/8	4	"	5976	61	28.50
4 1/4	10	24	5 3/4	4 1/2	"	5977	48	30.00
4 1/4	14	28	5 3/4	4 1/2	"	5978	58	32.50
4 1/4	18	32	5 3/4	4 1/2	"	5979	63	34.50
4 1/4	28	42	5 3/4	4 1/2	"	5980	75	39.00
4 3/4	14	30	6 3/8	5	1 1/8" Rod	6792	89	40.00
4 3/4	18	34	6 3/8	5	"	6793	95	42.00
4 3/4	28	44	6 3/8	5	"	6794	111	50.00
4 3/4	36	52	6 3/8	5	"	6795	124	56.00

\*In selecting a cylinder for a deep well head allow at least 2" for clearance at both the bottom and top of the stroke. In other words a 6' stroke pump would take a 10' stroke cylinder; a 9' stroke pump would take the 14' stroke cylinder, etc.

Check and plunger of either the Fig. 454 or 456 cylinder can be drawn through drop pipe without pulling cylinder. These cylinders are fitted with friction-proof, waterproof leathers and the finest, toughest rubber made. Tested to 900 pounds water pressure.

Fig. 456-Y Cylinder:—The barrel of this cylinder is of extra heavy pipe and lined with No. 16 gauge seamless hard brass tubing spun over at top and soldered at the tapered bottom. The cylinder is good for a working pressure of 500 pounds. The check and plunger are of the same type as used in the No. 454-Y priced at the top of this page.

### CLOSED OR CAPPED WELL CYLINDERS

The closed or capped cylinder is used where it is desired to use a well cylinder larger in diameter than the drop pipe. These installations are not popular because with a capped cylinder it is not possible to pull the cylinder plunger without pulling the entire drop pipe. However, where a capped cylinder is insisted upon the above prices may be used for computing purposes as there is little difference in price.



## FIG. 448 DEEP WELL CYLINDERS

With Four Cup Leathers

These cylinders are designed for use in very deep wells where extra heavy work is required. Wood sucker rods with forged couplings or air-tite steel rods are recommended for use with them.



ABOVE:—FIG. 448  
DEEP WELL CYLINDER

Inside Diam., Inches	Length Stroke, Inches	Gallons Per Stroke	Length Cyl., Inches	Outside Diam. Caps, Inches	Drop Pipe Size, Inches	Size Pin in Plunger, Inches	Octagon Wood Pump Rod Recommended, Inches	Approx. Shpg. Weight, Pounds	Outfit No.	Price F.O.B. Chicago
2 1/4	10	.172	29	3 9/16	2 1/2	7/8	1 5/8	20	7085	\$ 18.25
2 1/4	16	.275	35	3 9/16	2 1/2	7/8	1 5/8	22	5571	19.50
2 1/4	24	.41	43	3 9/16	2 1/2	7/8	1 5/8	25	5572	21.00
2 3/4	10	.257	31	3 7/8	3	7/8	1 5/8	29	7086	24.00
2 3/4	16	.411	37	3 7/8	3	7/8	1 5/8	31	5573	25.50
2 3/4	24	.61	45	3 7/8	3	7/8	1 5/8	33	5574	26.50
3 1/4	10	.360	35	4 7/16	3 1/2	1	1 7/8	45	7087	31.50
3 1/4	16	.574	41	4 7/16	3 1/2	1	1 7/8	47	5575	33.50
3 1/4	24	.862	49	4 7/16	3 1/2	1	1 7/8	50	5576	36.50
3 3/4	10	.478	37	5 5/8	4	1 1/8	2 1/4	57	7088	47.50
3 3/4	16	.764	43	5 5/8	4	1 1/8	2 1/4	59	5577	49.00
3 3/4	20	1.05	47	5 5/8	4	1 1/8	2 1/4	61	5578	51.00
3 3/4	24	1.147	51	5 5/8	4	1 1/8	2 1/4	63	5579	52.50
4 1/4	10	.614	39	5 3/4	4 1/2	1 1/8	2 1/4	75	7089	61.50
4 1/4	16	.982	45	5 3/4	4 1/2	1 1/8	2 1/4	77	5580	63.00
4 1/4	20	1.23	49	5 3/4	4 1/2	1 1/8	2 1/4	79	5581	65.00
4 1/4	24	1.473	53	5 3/4	4 1/2	1 1/8	2 1/4	81	5582	66.50
4 3/4	10	.767	41	6 1/4	5	1 1/8	2 1/4	92	7090	84.00
4 3/4	16	1.227	47	6 1/4	5	1 1/8	2 1/4	94	5583	89.50
4 3/4	20	1.53	51	6 1/4	5	1 1/8	2 1/4	96	5584	92.50
4 3/4	24	1.84	55	6 1/4	5	1 1/8	2 1/4	99	5585	95.00
5 3/4	10	1.12	48	7 1/4	6	1 1/8	2 1/4	140	7091	120.00
5 3/4	16	1.798	54	7 1/4	6	1 1/8	2 1/4	143	5586	126.00
5 3/4	20	2.2	58	7 1/4	6	1 1/8	2 1/4	146	5587	131.50
5 3/4	24	2.69	62	7 1/4	6	1 1/8	2 1/4	149	5588	136.50
5 3/4	36	4.04	74	7 1/4	6	1 1/8	2 1/4	159	5589	152.50

## No. 450-S EUREKA TUBULAR WELL CYLINDERS

These cylinders are for use where it is desired to get the largest diameter cylinder possible in a given well pipe. They are set in place after the well is made by means of a seating tool attached to the drill rod. The seating tool revolves the cylinder shell and screws it down on the spring dog coupling attached to the inside walls of the pipe.

The rubber packing between the cylinder and the coupling is thus forced out against the pipe and makes a firm tight joint.

These cylinders should be ordered by size of well.

Well Size, Inches	Cylinder Size, Inches	Stroke, Inches	Approximate Shipping Weight, Pounds	Outfit Number	Price F. O. B. Chicago
2	1 13/16	12	16	5502	\$ 6.50
2 1/2	2 1/4	12	19	5503	10.00
3	2 3/4	12	22	5504	14.50
3 1/2	3	12	24	7092	29.00
2	1 13/16	16	20	6600	7.50
2 1/2	2 1/4	16	24	6601	12.00
3	2 3/4	16	30	6602	16.50
3 1/2	3	16	33	7093	31.50

## No. 451 SEATING TOOL FOR EUREKA CYLINDER

In installing a Eureka Cylinder a seating tool is necessary. This tool is not regularly furnished with the cylinder but may be secured on special order. The price is as follows:

For Cylinder Size, Inches	Outfit Number	Price
1 13/16	5568	\$ .75
2 1/4	5569	1.10
2 3/4	5570	1.45
3	7094	2.60

ABOVE:—FIG. 450-S  
SPRING VALVE  
EUREKA CYLINDER





# Octagon Wood Pump Rod

F. O. B. Poplar Grove, Mo., or Columbus, O.

Size of Rod, Inches	Size of Box Pin, Inches	Threads per Inch	Pipe Size Inches	Couplings Only			Rod Complete with Coupling		
				Price per Pair		Weight per Pair, Lbs.	*Per 100 Feet		
				Black	Galv.		Weight, Lbs.	Price (Black)	Price (Galv.)
1 1/8	5/8	12	2	1.10	1.40	3	42	\$15.50	\$17.75
1 3/8	7/8	10	2 1/2	1.90	2.20	6	69	23.25	26.50
1 5/8	7/8	10	3	1.90	2.20	6	100	27.50	31.00
1 7/8	1	10	3 1/2	3.10	3.75	9	150	37.50	41.75
2 1/4	1 1/8	8	4	5.00	6.25	15	200	62.00	71.50
2 1/2	1 1/8	8	4 1/2	5.00	6.25	15	240	71.50	80.00

Above prices are for rods in random lengths, approximately from 16' to 22'-6" long. Random lengths will be shipped unless otherwise specified. Overshipment when necessary will not exceed 10%. Orders other than random lengths will be charged for as specials, in keeping with extra cost.

## Galvanized Steel Pump Rod

Threaded and Coupled  
F. O. B. Dubuque, Ia.

Size, Inches	Weight Per Foot	Outfit No.	Price per Foot
3/8	6 oz.	6603	\$.06
7/16	8 oz.	6604	.08
1/2	11 oz.	6605	.11

## Galvanized Wrought Steel Pipe

Plugged and Reamed in Random Lengths

Outfit No.	Size, Inches	Outside Diameter, Inches	Weight per Foot, Lbs.	Price per 100 ft. F.O.B. Chicago
5637	1 1/2	1.90	2.68	\$27.50
5638	2	2.375	3.61	38.50
5639	2 1/2	2.875	5.74	61.00
5640	3	3.50	7.54	80.00
5641	3 1/2	4.00	9.00	98.50
5642	4	4.50	10.66	116.50
5643	4 1/2	5.00	12.49	136.00
5644	5	5.563	14.50	158.00
5645	6	6.625	18.76	206.00

Above: Octagon Wood Pump Rod and Couplings.

## Air-Tite Steel Sucker Rod

F. O. B. Chicago

This is a hollow air-tight rod, and the dry air compartment throughout the length of each rod makes it semi-floating and reduces the strain on the pump piston. It has the same coupling thread as wood rod and may be used with it. The steel couplings are electrically welded into the rod. Each piece has square shouldered joints which make it as easy to install as wood rod.

Rod No.	Weight 100 Feet	Corres. Size Wood Rod, Inches	Size Box and Pin, Inches	Price per 100 Ft. in Lengths Specified Below									
				Random Lengths (Approx. 20')		18 Foot Lengths		15 Foot Lengths		10 Foot Lengths		5 Foot Lengths	
				Black	Galv.	Black	Galv.	Black	Galv.	Black	Galv.	Black	Galv.
1	60 lbs.	1 1/8	5/8	\$ 9.50	\$13.00	\$9.50	\$13.00	\$10.75	\$15.00	\$12.50	\$16.75	\$17.75	\$23.50
2	122 lbs.	1 3/8 or 1 5/8	7/8	14.50	19.50	14.50	19.50	16.25	21.50	19.50	25.50	26.00	35.00
3	180 lbs.	1 7/8	1	22.50	29.00	23.50	30.50	25.00	32.50	29.00	36.25	39.50	48.50
4	250 lbs.	2 1/4	1 1/8	30.00	39.00	32.50	42.75	33.50	44.50	37.25	48.50	50.00	63.00
5	415 lbs.	3 or 3 1/2	1 1/2	55.75	72.50	61.50	81.50	65.00	84.00	75.00	93.00	97.50	116.00

### ADDITIONAL SPECIFICATIONS—AIR-TITE STEEL SUCKER ROD

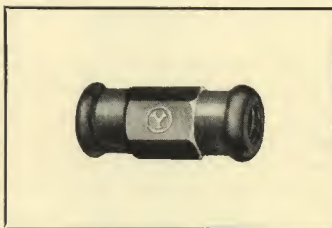
	No. 1	No. 2	No. 3	No. 4	No. 5
Outside Diameter at Joints.....	1 1/32"	1 7/16"	1 9/16"	1 15/16"	2 1/2"
Inside Diameter.....	.493	.824	1.049	1.380	2.067
Approximate Feet per Bundle.....	200	120	100	60	20



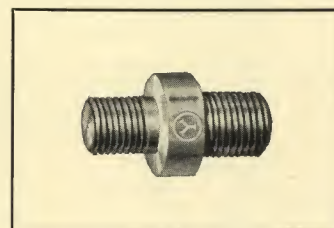
# COUPLINGS AND STEEL SUBSTITUTES



No. 429 PUMP ROD COUPLING



No. 430 BEADED ROD COUPLING



STEEL SUBSTITUTE

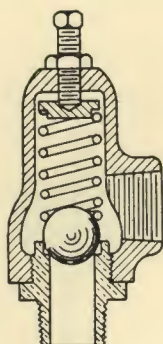
PUMP PISTON ROD (Diameter and Threads per Inch)	Sucker Rod	COUPLING REQUIRED									
		AT PUMP				AT CYLINDER					
		Coupling Required	Cat. No.	Price Each	2 3/4" Diameter and Smaller			3 1/4" Diameter and Larger			
					Coupling Required	Cat. No.	Price Each	Coupling Required	Cat. No.	Price Each	
USED ON:— No. 6 "C" Head 3/4 HP "DC" Head 2 HP "DC" Head 3/4 HP "DC" Head	1 1/8" Wood	None Required	.....	.....	None Required	.....	.....	7/8"—10M x 5/8"—12F	Cylinders 3 1/4" and larger can be furnished with the Plunger cage tapped for the particular rod it is intended to use thus eliminating necessity for special coupling at cylinder		
	3/8" Rod	5/8"—12F x 3/8"—14F	430	\$0.12	5/8"—12M x 3/8"—14F	.....	Steel Sub.	\$0.75		7/8"—10M x 3/8"—14F	
	1/16" Rod	5/8"—12F x 1/16"—12F	430	0.12	5/8"—12M x 1/16"—12F	"	.75	7/8"—10M x 1/16"—12F			
	1/2" Rod	5/8"—12F x 1/2"—12F	430	0.12	5/8"—12M x 1/2"—12F	"	.75	7/8"—10M x 1/2"—12F			
	3/8" Rod	5/8"—12F x 3/8"—12F	429	0.22	None Required	.....	.....	7/8"—10M x 5/8"—12F			
	3/8" Pipe	7/8"—12F x 3/8" Pipe F	429	0.22	5/8"—12M x 3/8" Pipe F	.....	Steel Sub.	.75		7/8"—10M x 3/8" Pipe F	
7/8"—10	1 3/8" Wood	None Required	.....	.....	7/8"—10F x 5/8"—12M	.....	Steel Sub.	1.50	None Required		
	1 5/8" Wood	None Required	.....	.....	7/8"—10F x 5/8"—12M	"	1.50	None Required			
	1/2" Rod	7/8"—10F x 1/2"—12F	.....	Steel Sub.	1.25	1/2"—12F x 5/8"—12M	"	1.50	7/8"—10M x 1/2"—12F		
	5/8" Rod	7/8"—10F x 5/8" Rod	"	1.25	None Required	"	.....	7/8"—10M x 5/8"—12F			
	3/8" Pipe	7/8"—10F x 3/8" Pipe F	"	1.25	3/8" PipeF x 5/8"—12M	"	1.50	7/8"—10M x 3/8" Pipe F			
	1/2" Pipe	7/8"—10F x 1/2" Pipe F	"	1.25	1/2" Pipe F x 5/8"—12M	"	1.50	7/8"—10M x 1/2" Pipe F			
USED ON:— No. 9 "B" Head No. 12 "B" Head 2 HP "DC" Head 3 HP "DC" Head											

Cylinders 3 1/4" and larger can be furnished with the Plunger cage tapped for the particular rod it is intended to use thus eliminating necessity for special coupling at cylinder

**Well Cylinder Plunger Tapping:**—All well cylinders 2 3/4" in diameter and smaller are regularly tapped 5/8"—12 for 1 1/8" wood rod. Cylinders 3 1/4" in diameter and larger are regularly tapped 7/8"—10 for 1 1/8" or 1 5/8" wood rod but the plunger on these larger cylinders can be tapped special for other sucker rods when so ordered, thereby eliminating the use of a coupling at the cylinder plunger.

In ordering couplings or substitutes give complete description of threading desired (from table) also specify the catalog number in the case of the coupling.





Beloit Special Relief Valve

### Relief Valves—Check Valves

When ordering relief valves, specify figure number, size of pipe connection and pressure at which valve is to be set.

**At the left**—"Beloit" Relief Valve. This is an inexpensive valve with cast iron body, painted, with brass seat and stainless steel ball valve. It has an adjustable screw for regulating the spring tension.

**At the right**—Figure 20 Relief Valve. An all-bronze relief valve with outlet in the base casting making it possible to repair the valve without disturbing the inlet or outlet connections. Can be furnished with female inlet if desired. Hexagon head for changing relieving pressure is covered by hood to prevent tampering with adjustment by unauthorized persons.



Fig. 20 Relief Valve

#### Beloit Special Relief Valves F. O. B. Beloit

Size Pipe Connection, Inches	Used With	Pressure Setting	For Max. Tank Pressure Inches	Overall Length, Inches	Outfit No.	Price
1/2	Shallow Well Pumps 500 G.P.H. and Less Also 1/4 H.P. "DC" Deep Well	60	40	4 1/4	6970	\$1.35
3/4	No. 6 "C" Head 1/2 and 3/4 H.P. "DC" 600 and 1000 G.P.H. Typhoon	60 85 120	40 65 100	5 1/4 5 1/8 4 7/8	6971	3.00
1	No. 9 "B" Head 2 and 3 H.P. "DC" 1500 G.P.H. Typhoon	60 85 120	40 65 100	6 1/2 6 3/8 6 1/8	6972	4.30

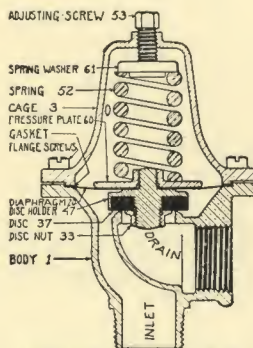
#### Fig. 20 Relief Valves F. O. B. Ft. Wayne, Ind.

Size Pipe Connection, Inches	Recommended For	Outfit No.	Price
1	.....	5596	\$7.00
1 1/4	{No. 12 "B" Head 2500 GPH Typhoon	5597	8.75
1 1/2	.....	5598	10.50
2	.....	5599	14.50

#### No. 1155 Brass Relief Valve

This valve supersedes the No. 1126 and can be used where a better grade relief valve is desired.

Size, Inches	Outfit No.	Price F.O.B. Chicago
1/2	8002	\$ 4.80
3/4	8003	5.50
1	8004	6.60
1 1/4	8005	7.25
1 1/2	8006	9.75
2	8007	13.75



Diaphragm Relief Valve

#### Diaphragm Relief Valves

F. O. B. Lawrence, Mass. or New York City, Chicago

These relief valves have cast bronze body and forged bronze dome. Male inlet and female drain. They are provided with hexagonal head adjusting screw. Range of adjustment is 30 to 125 lbs.

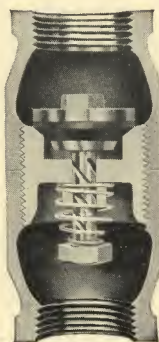
Size Pipe Connection, Inches	Type	Height, Inches	Diam., Inches	Outfit No.	Price
1/2	30A	4 3/4	2 1/2	6992	\$ 3.70
3/4	30A	5 1/2	3	6993	4.50
1	300A	7	4	6996	11.75
1 1/4	300A	8	4 1/2	6998	18.50
1 1/2	300A	9	5	7000	23.00

#### Spring Valve Checks

#### Beloit Special Check Valves F. O. B. Beloit

May be used in either horizontal or vertical position. Silent in operation. Rubber to brass seat with painted cast iron body.

Pipe Connection, Inches	Used With	Outfit No.	Price
3/4	{Shallow Well Pumps 500 GPH and Less	6973	\$1.85
1 1/4	{No. 6 "C" Head, 600 & 1000 GPH Typhoon	6974	3.25



Spring Valve Check

#### Fig. 530 Check Valves (Galvanized)

This valve may also be used in either horizontal or vertical position. Silent in operation. Rubber to brass seat with malleable iron body, galvanized.

Pipe Connection, In.	Outside Diam., In.	Suitable For	Outfit No.	Price
1	1 15/16	.....	6608	\$2.25
1 1/2	2 3/4	1500 GPH Typhoon	1610	4.25
2	3 5/16	No. 9 "B" Head, 2500 GPH Typhoon, 2 and 3 H.P. "DC" Head	6611	6.00
2 1/2	.....	No. 12 "B" Head 5000 GPH Typhoon	(Use Fig. 34 Check)	

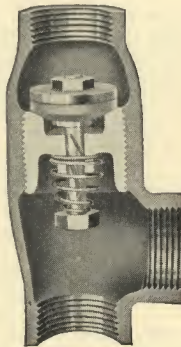


## CHECK VALVES—FOOT VALVES

### Beloit Special Fresh Water Valve

This valve is the same as the Beloit Special check valve listed on previous page except that it has side outlet and a bleeder hole. May be used in either horizontal or vertical position. Rubber to brass seat with painted cast iron body.

Size	Lgth.	Used With	Outfit No.	Price F.O.B. Beloit
3/4"	4 3/4"	{Shallow Well Plants 500 GPH and less, 1/4 H.P. "DC" Head.....	6975	\$2.20
1 1/4"	6 1/4"	{No. 6 "C" Head, 600 and 1000 GPH Typhoons, 1/2 and 3/4 H.P. "DC" Heads	6976	3.50



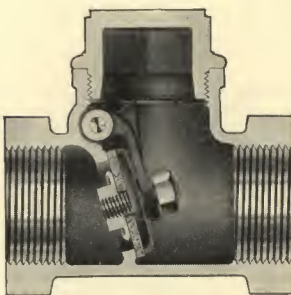
ABOVE:—Fig. 531 Fresh Water Valve. The "Beloit Special" Valve is about the same in general construction.

### Fig. 531 Fresh Water Valve (Galvanized)

This valve is the same as the Fig. 530 check valve listed on previous page except that it has side outlet and a 1/16" bleeder hole. May be used in either horizontal or vertical position.

Size	Lgth.	Suitable for Use With	Outfit No.	Price F.O.B. Chicago
1"	5"	.....	6784	\$2.35
1 1/2"	6 3/4"	1500 GPH Typhoon.....	6786	4.40
2"	7 3/4"	{No. 9 "B" Head, 2500 GPH Typhoon, 2 and 3 H.P. "DC" Heads.....	6787	6.60
2 1/2"		{5000 GPH Typhoon, No. 12 "B" Head.....	(Use Fig. 34 Check)	11.60

### Fig. 34 1/2 Swing Check Valves Horizontal Type, Brass, with Leather Disc



Size Inches	Outfit Number	Price F.O.B. Chicago
3/4	5614	\$ 2.25
1	5615	2.80
1 1/4	5616	3.60
1 1/2	5617	4.60
2	5618	6.35
*2 1/2	*6606	11.60
*3	*6719	18.50

\*The 2 1/2" and 3" sizes are Fig. 34, brass disc.

NOTE:—Where check valves are used as fresh water valves, a 1/16" bleeder hole should be drilled in the valve seat (where it will not be obstructed) to prevent continual starting and stopping of the pump in the case of a slight leak in the piping.

### Fig. 394 Combined Foot Valve and Strainer (Galvanized—With Leather Disc)



Size, Inches	Suitable for Use with Pumps Up To	Largest Outside Diameter, Inches	Total Height, Inches	Outfit Number	Price F.O.B. Chicago
3/4	200 GPH	3 3/4	3 3/4	5601	\$ 1.20
1	250 GPH	3 3/4	3 3/4	5602	1.40
1 1/4	600 GPH	4 1/8	4 1/4	5603	1.45
1 1/2	1000 GPH	4 3/4	4 3/4	5604	2.00
2	1500 GPH	5 1/2	5 5/8	5605	2.50
2 1/2	2500 GPH	6 1/4	6 3/8	5606	3.50
3	5000 GPH	7	7 1/8	5607	4.00
3 1/2	.....	8 7/8	9 1/4	6767	5.85
4	.....	8 7/8	9 1/4	6768	7.60
4 1/2	.....	10 1/2	11 1/4	6769	10.85
5	.....	10 1/2	11 1/4	6770	11.50

### Fig. 300 Clearflow Foot Valves

A valve of small outside diameter which may be used to advantage in driven wells of small diameter. The Clearflow is an all-brass, seamless, non-corrosive valve, quick closing, self-cleaning, long wearing.



Valve Tap (Standard Pipe)	Fits Inside	Suitable for Use With Pumps Up To	Outfit Number	Price F.O.B. Chicago or W. Berkeley, Calif.
3/4"	1 1/4" Pipe	200 GPH	6617	\$1.35
1"	1 1/2" Pipe	250 GPH	6618	1.60
1 1/4"	2" Pipe	600 GPH	6619	1.90





**Fig. 533 Foot Valve with Strainer**  
(Galvanized)

The valve part of this is the same as the Fig. 530. The strainer is of malleable iron covered with perforated sheet brass. May be used where a higher grade valve is desired than the Fig. 394.

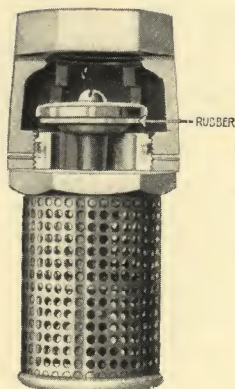
Size Inches	Outside Diameter, Inches	Suitable for Use with Pumps Up To	Outfit Number	Price F.O.B. Chicago
3/4	1 1/16	200 GPH	6612	\$1.95
1	1 1/8	250 GPH	6613	2.50
1 1/4	2 1/4	500-600 GPH	6614	3.20
1 1/2	2 13/16	1000 GPH	6615	4.25
2	3 1/8	1500 GPH	6616	6.20

**Fig. 49 "Sure-Tite" Foot Valve with Strainer**  
(Galvanized)

These foot valves are not spring-loaded so that on the deeper suction lifts they will be found to be more satisfactory than the Fig. 533 listed above. Because of the fact the latter are spring-loaded, about 2 feet of the 22 feet suction lift of the pump will be utilized in opening the valve.

A perfectly finished Brass Seat and Brass Poppet, faced with a Rubber Disc of the very best quality, makes a perfect seating and an air tight joint. The Poppet guides and stops in the upper casting are so constructed that the valve will always seat properly and there is ample water-way passage so that it does not cause friction.

The strainer is covered with perforated sheet brass with the bottom completely closed.



Size	Suitable For Use With Pumps Up To	Outside Diameter	Total Height	GALVANIZED		ALL BRASS	
				Outfit Number	Price F.O.B. Kewanee, Ill.	Outfit Number	Price F.O.B. Kewanee, Ill.
3/4"	200 GPH	2 3/8"	5 3/4"	6977		6981	\$2.85
1"	250 GPH	2 3/8"	5 3/4"	6978	\$1.60	6982	2.85
1 1/4"	500-600 GPH	2 3/4"	5 3/4"	6979	2.10	6983	3.50
1 1/2"	1000 GPH	2 13/16"	6"	6980	2.40	6984	4.10

**Beloit Globe Valves**  
(100 Lbs. Pressure)

Size Inches	Outfit Number	Price F.O.B. Beloit
3/4	7095	\$1.30
1 1/4	7096	2.40
2	7097	4.80

Above valves used as standard in the following piping packages:

3/4" size used with 250 and 500 GPH shallow well pumps and 1/4 H.P. "DC" head.

1 1/4" size used with No. 6 "C" head; 600 and 1000 G.P.H. Typhoon pumps and 1/2 and 3/4 H.P. "DC" heads.

2" size used with No. 9 "B" head; 2500 G.P.H. Typhoon pump; and 2 and 3 H.P. "DC" heads.



**Fig. 440**  
**Standard Brass Gate Valves**  
(Double Disc-125 Lbs. Pressure)

Size Inches	Outfit Number	Price F.O.B. Chicago
3/4	5619	\$1.60
1	5620	2.15
1 1/4	5621	2.85
1 1/2	5622	3.85
2	5623	5.60
2 1/2	5624	10.00
3	5625	14.75

## Air Chambers

An air chamber should be provided in the suction pipe line when water is being drawn through a long run of pipe and in the discharge line when water is being forced to a distance or an elevation. In both cases they should be as near away with water hammer.

The air chamber should have an inside volume about ten times as large as the volumetric displacement of one stroke of the pump plunger, or of the well cylinder or pressure cylinder plunger of a deep well pump.

**Beloit Special Air Chambers**  
F. O. B. Beloit

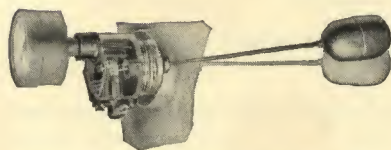
These air chambers are made of cast iron, painted, and are tapped in the base for connection to either suction of discharge piping and in the neck near the bottom for 1/4" pipe for pressure switch connection. The 2" size also has a 1 1/4" pipe tap in the side near the bottom for attachment of the air control when the air chamber also serves as a tank.

Tapped for Standard Pipe	Height, Inches	Outside Diameter, Inches	Approx. Inside Volume Cubic Inches	Approx. Shipping Weight, Pounds	Used with Deep Well Pump Indicated Below	Outfit No.	Price F.O.B. Beloit
3/4"	11	5	120	11	1/4 H.P. "DC" Head.....	6969	\$4.00
1"	14 1/4	6 1/4	285	20	No. 6 "C" Head, 1/2 and 3/4 H.P.		
					"DC" Heads.....	5899	6.00
1 1/2"	19 1/4	8 3/8	700	50	No. 9 "B" Head, 2 and 3 H.P.		
					"DC" Heads.....	6721	11.00
2"	25	11	1570	85	No. 12 "B" Head.....	5933	16.00





## Air Control For Shallow Well Pumps



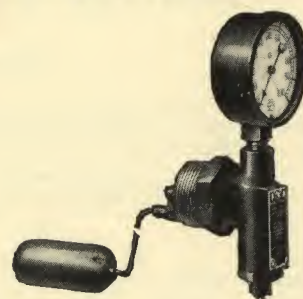
Shallow Well Air Control with Gauge

## Pressure Gauges (When Furnished Separately)

Size, Inches	Outfit No.	Price
*2	5478	\$1.60
3	8001	2.00
4 1/2	6953	2.75

\*The 2" gauge is the Beloit standard.

## Air Control For Deep Well Pumps



Deep Well Air Control with Gauge

Control for automatically keeping the required amount of air in a pressure tank. Screws into a 1 1/4" tap in the storage tank. Regularly furnished with 48" of copper tubing to connect to air sniffer valve on pump.

	Outfit No.	Price
Control Less Pressure Gauge.....	6793	\$4.00
Control with Pressure Gauge.....	7099	5.50

Automatic air release valve for deep well pressure tank systems. Screws into a 1 1/4" tap in the storage tank. Float controlled valve automatically opens and relieves air when tank becomes air bound.

	Outfit No.	Price
Control Less Pressure Gauge.....	6796	\$4.00
Control with Pressure Gauge.....	8000	5.50

## Pressure Switches for Motor Control

**How to Order:**—In ordering pressure or float switches or overload relays, give outfit number of the switch desired and in addition give the horse power, voltage, phase and cycles (if alternating current), and the full load current rating of the motor, if known. (The full load current is usually given on the motor nameplate.) Also specify the "cut-in" and "cut-out" pressure for which the switch is to be adjusted.



### H.P. RATINGS Nos. 9013, 9014 AND 9036 SWITCHES

	Direct Current	Single Phase	3 Phase
32 volts	1/2 H.P.		
110 volts	3/4 H.P.	2 H.P.	3 H.P.
220 volts		3 H.P.	5 H.P.
440 volts		5 H.P.	5 H.P.

With motors larger than the above, a secondary starter is necessary in addition to the pressure switch. Prices on application.

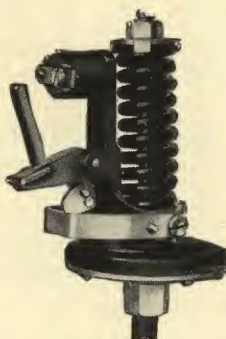
Above—No. 9014 two pole pressure switch for control of motor. Good for control of motors in horse powers listed above.

### SWITCHES FOR FLOAT CONTROL

The 9013 pressure switch may be adapted for float service to start and stop the motor at predetermined levels in an open type storage tank. Price includes switch with mounting feet, 5 feet of rod, two rod stops, and 7" copper ball float.

Catalog No.	Description	Price
9036	2-Pole, for Tank Mounting Add if Floor Base is Desired	\$15.50 4.00

The No. 9020 overload relay, priced in pressure switch table above, can also be used with the float switch when overload and low voltage protection is desired.



9013G Engine  
Ignition Switch

### PRESSURE SWITCH PRICES

Catalog No.	Maximum Pressure, Lbs.	Cut-in Cut-Out Range, Lbs.	Price
9014A	80	10 to 25	\$7.00
9013A	225	10 to 45	9.00

### OVERLOAD RELAY

The 9020 overload relay priced below may be used in connection with either the No. 9014A or No. 9013A switch to give the motor overload and low voltage protection.

Catalog No.		Price
9020B	Single Pole for Single Phase Motors.....	\$4.50
9020A	Two Pole for Three Phase Motors.....	9.00

### ENGINE IGNITION SWITCH

When engine driven outfits are used in connection with a pressure tank, the following engine ignition grounding switch can be furnished to ground the magneto and stop the engine automatically when the tank pressure reaches the desired maximum:

Catalog No.	Maximum Operating Pressure	Price
9013G	225 lbs.	\$10.00



## PNEUMATIC TANKS

35 & 70 GAL. TANK PRICES F. O. B. BELOIT  
TANKS LARGER THAN 70 GAL. F.O.B. CHICAGO OR CONSHOHOCKEN (PHILADELPHIA), PA.

### STANDARD—FOR 75 LBS. WORKING PRESSURE

These tanks have welded seams and are tested to a pressure of 150 lbs. per square inch before leaving factory. Guaranteed working pressure, 75 lbs. Unless otherwise specified, Standard tanks 365 gallons and larger will be furnished for horizontal installation. Standard tanks 315 gallons and smaller are furnished for vertical installation.

The Black tanks are painted with two coats of preservative paint. The Galvanized tanks are galvanized inside and out.

Size Tank, Gals.	Diam., Inches	Length, Feet	Gauge Material			BLACK			GALVANIZED		
			Shell	Head	Bottom	Outfit No.	Approx. Shipping Weight, Lbs.	Price	Outfit No.	Approx. Shipping Weight, Lbs.	Price
35	18	2'-9"	14	8	8				5476	75	\$16.00
70	18	5	14	8	8				5484	110	24.50
120	24	5	12	9	9	6917	190	\$22.00	6885	210	27.50
220	30	6	10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	6887	410	38.00	6886	440	45.00
315	36	6	10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	6889	465	48.50	6888	500	76.50
365	30	10	10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	6898	550	58.00	6918	595	87.00
525	36	10	10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	6890	675	68.00	6957	730	114.00
1000	42	14	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	6891	1430	108.00	6958	1550	196.00
*1500	48	16	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	6899	1860	136.50	6959	2015	247.00
*2260	48	24	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	6900	2620	182.00	6960	2840	392.00

### EXTRA HEAVY—FOR 100 LBS. WORKING PRESSURE

These Extra Heavy tanks are made with double welded lap joint longitudinal seams, welded inside and outside, and are designed for 100 lbs. working pressure. They are thoroughly tested to a pressure of 200 lbs. at the factory.

The Black tanks are painted with two coats of preservative paint. The Galvanized tanks are galvanized inside and out.

Size Tank, Gals.	Diam., Inches	Length, Feet	Gauge Material			BLACK			GALVANIZED		
			Shell	Head	Bottom	Outfit No.	Approx. Shipping Weight, Lbs.	Price	Outfit No.	Approx. Shipping Weight, Lbs.	Price
85	20	5	10	9	$\frac{3}{16}$ "	6961	200	\$22.50	6938	210	\$34.00
120	24	5	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{1}{4}$ "	6962	300	32.00	6939	315	49.50
220	30	6	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{5}{16}$ "	6963	490	44.00	6940	515	69.50
315	36	6	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	6964	620	52.50	6941	650	87.50
365	30	10	$\frac{3}{16}$ "	$\frac{3}{16}$ "	$\frac{5}{16}$ "	6965	730	60.50	6942	770	101.50
420	36	8	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	6966	770	66.00	6943	810	111.50
430	42	6	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	6967	940	72.00	6944	990	128.00
525	36	10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{5}{16}$ "	6968	910	74.00	6945	955	128.00
940	48	10	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	6931	1670	122.00	6946	1755	229.50
1020	42	14	$\frac{1}{4}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	6932	1940	126.00	6947	2040	239.50
*1500	48	16	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	6933	2610	164.00	6948	2740	318.00
*2260	48	24	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	6934	3710	222.00	6949	3895	514.00
*3000	60	20	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	6935	4300	288.00	6950	4650	650.00
*3500	60	24	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	6936	5000	328.00	6951	5400	735.00
*4160	60	30	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{3}{8}$ "	6937	6050	390.00	6952	6500	885.00

\*These tanks are too long to go into the regular side door of a freight car so will fall into a higher freight classification and take an increased freight rate of approximately 50c per 100 lbs.

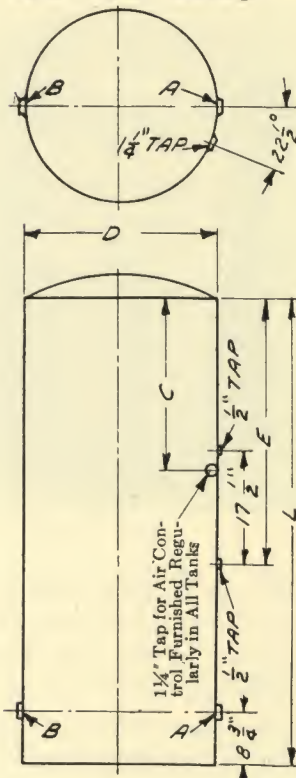
### ACCESSORY EQUIPMENT FOR TANKS

Equipment	Outfit Number	Add to Cash Selling Price
16" Water Glass Gauge (for 17 $\frac{1}{2}$ " center to center tapings on tanks 120 gals. and larger)	6954	\$3.00
12" Water Glass Gauge (for 13 $\frac{1}{2}$ " center to center tapings on 35 and 70 gallon tanks)	5477	2.70
3 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ " Handhole in Head of Tanks 85 gals. and larger		6.00
Manhole in Head of Tanks 1000 gals. and larger		20.00
Manhole in Shell of Tanks 1000 gals. and larger		30.00



## DIMENSION PRINT OF TANKS FOR FAIRBANKS-MORSE COMPLETE WATER SYSTEMS

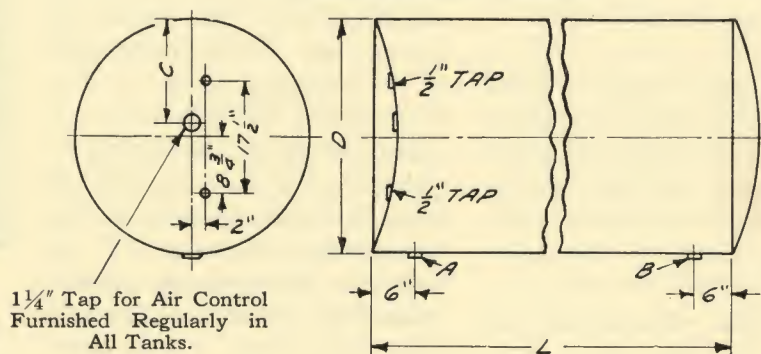
### VERTICAL TANKS



Standard tanks { 75 lbs. Working Pressure  
150 lbs. Test

Extra Heavy tanks { 100 lbs. Working Pressure  
200 lbs. Test

### HORIZONTAL TANKS



**Air Control Tap:**—The 1 1/4" air control tap regularly furnished is suitable, both in position and size, to receive the air control for either shallow well or deep well pump service.

### Inlet and Outlet Taps (For Either Vertical or Horizontal Tanks)

Size of Pump	*Inlet "A"	*Outlet "B"
200 and 250 GPH.....	1 1/4"	1"
420 and 500 ".....	1 1/4"	1"
600 ".....	1 1/4"	1"
1000 ".....	1 1/4"	1"
1500 ".....	1 1/2"	1 1/4"
2500 ".....	2"	1 1/2"
5000 ".....	2 1/2"	2 1/2"
No. 6 Type "C".....	1 1/4"	1"
No. 9 " " "C".....	2"	1 1/2"
No. 12 " " "C".....	2 1/2"	1 1/2"
1/4 H.P. "DC".....	1 1/4"	1"
1/2 " " ".....	1 1/4"	1"
3/4 " " ".....	1 1/4"	1"
2 " " ".....	2"	1 1/2"
3 " " ".....	2"	1 1/2"

Size of Tank	Dimensions of Tank		Dimension "C" (Air Control Tap)		Dimension "E" for Vertical Tanks Only
	D	L	Vert.	Horiz.	
35 gal.	18"	33"	9"	.....	15 3/4"
70 "	18"	60"	22"	.....	34 3/4"
85 "	20"	60"	22"	.....	36"
120 "	24"	60"	22"	.....	36"
220 "	30"	72"	27"	13 1/4"	41"
315 "	36"	72"	27"	15 3/4"	41"
365 "	30"	120"	47"	13"	61" (Not Std.)
420 "	36"	96"	37"	15 3/4"	51" (Not Std.)
430 "	42"	72"	27"	18 1/2"	41" (Not Std.)
525 "	36"	120"	47"	15 3/4"	61" (Not Std.)
940 "	48"	120"	47"	21"	61" (Not Std.)
1000 "	42"	168"	.....	18 1/2"	.....
1500 "	48"	192"	.....	21"	.....
2260 "	48"	288"	.....	21"	.....
3000 "	60"	240"	.....	26 1/4"	.....
3500 "	60"	288"	.....	26 1/4"	.....
4160 "	60"	360"	.....	26 1/4"	.....

NOTE:—Unless otherwise specified tanks up to and including six feet in length will be furnished for vertical installation.

\*In the absence of definite specifications as to size of tapping wanted, tanks with 1 1/4" inlet and 1" outlet will be furnished.  
Print No. RTJ-111



# Fairbanks-Morse Sanitary Septic Tanks

▼ ▼ ▼  
Easy to Install  
Low in Price  
No chemicals required

▼ ▼ ▼  
F-M Sanitary Septic Tanks provide a safe, modern and sanitary means of sewage disposal for the farm, suburban home, factory, school or country club beyond the range of city sewage mains.

These tanks should not be confused with the out-of-date and much less satisfactory cess-

pool means of sewage disposal. The septic tank actually decomposes the solids in the sewage by means of bacterial action brought about by the absence of air in the tank. No chemicals are required. The liquids formed in the breaking down of this solid matter combine with the watery wastes of the sewage to form the overflow or effluent from the tank, which seeps out through the discharge of the tank into the drainage system commonly referred to as the purification field. (See illustrations.) In the purification

▼ ▼ ▼  
Fig. 75. Fairbanks-Morse Septic Tanks are available in four practical sizes. Low in price—high in efficiency.  
▼ ▼ ▼

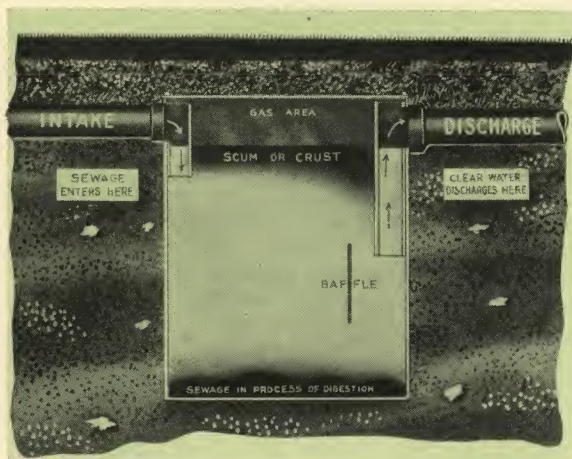


field the liquified sewage from the tank is purified by bacterial reaction in the top soil. The top soil (top 20" to 24") contains thousands of bacteria which change organic matter into the kind of food necessary for the growth of grass, trees and vegetation.

## A Two-Fold Investment

The F-M Sanitary Septic Tank not only constitutes an ideal health insurance, but it increases property value far beyond its original moderate cost.

The suburban home owner of



▼ ▼ ▼  
Fig. 76. Cross-sectional view of F-M Sanitary Septic Tank. Note intake is piped to higher opening in the tank.  
▼ ▼ ▼

## SIZES AND RATINGS—FAIRBANKS-MORSE SANITARY SEPTIC TANKS

Number	Total Capacity, Gallons	Working Capacity, Gallons	Gauge	Number of People			Size	Approx. Shipping Weight, Pounds	Price F.O.B. Perry, N. Y.
				Home	School	Factory			
42	235	200	No. 14	6	15	12	38" x 48" deep	215	\$17.00
43	350	300	No. 14	9	25	20	46" x 48" deep	265	20.00
* 45	550	500	No. 14	18	40	35	52" x 60" deep	360	37.00
*510	1100	1000	No. 12	40	80	70	52" x 120" long	780	90.00

\*Shipped only from Perry, N. Y.



a few years ago could do one of two things regarding sewage disposal. First—he might use a cesspool—always very dangerous because of the ever-present and ever-spreading pollution. Second—he might build a septic tank in the ground—a better plan but still doubtful because it is difficult to make a tank of this kind water-tight. Seepage or cracked walls change the home-made septic system into a dangerous cesspool.

Now with the F-M Sanitary Septic Tank, this troublesome problem is completely solved. Sewage disposal is made safer—and easier.

### No Odors

These tanks absolutely pre-

▼ ▼ ▼  
Fig. 77. A typical installation. The leaching well (a hole filled with stone) placed at the end of the main drain line will provide for overloads if the soil is tight. If semiporous, the leaching well may be omitted.  
▼ ▼ ▼

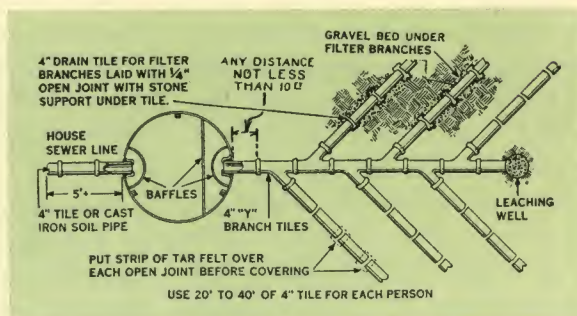
vent odors and soil contamination. They are as practical as they are scientific, and their low prices place them within the reach of all.

### Four Sizes

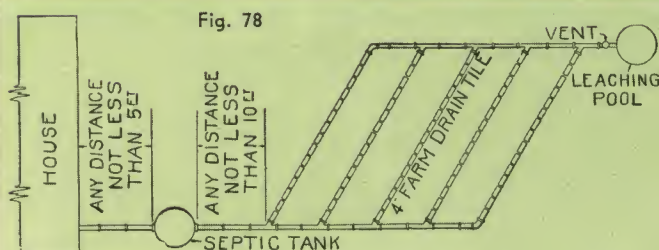
F-M Septic Tanks are available in four sizes: 200, 300, 500 and 1000 gallons working capacity. They are constructed of the very best quality blue annealed steel, coated inside and

out with a heavy coating of black plastic enamel applied by the "hot dip" process. Tanks of 500 gallons and smaller are of No. 14 gauge steel; the 1000 gallon size is made of No. 12 gauge. All tanks are electrically welded throughout, no rivets or "spot" welds being used. The cover is removable and is secured by three bolts.

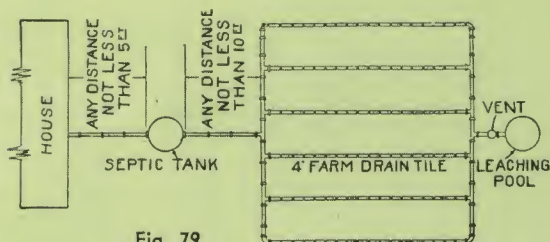
The 500 and 1000 gallon sizes are designed for larger instal-



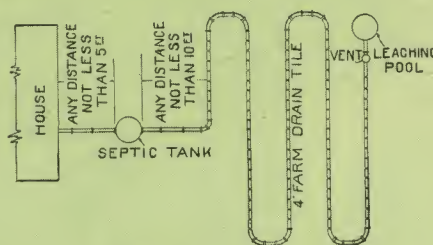
## SOME SPECIAL SEPTIC TANK INSTALLATION LAYOUTS



The plan illustrated at the left may be used with either porous or non-porous soils. If the soil is heavy clay, a leaching pool the size of the tank should be provided. Where soil is semi-porous, the leaching pool can be eliminated. In either case a vent should be provided as indicated.



This type of installation provides the best distribution and assures proper aeration of the effluent. In non porous soils a leaching pool as recommended in Figure 77 should be used; in porous soils the leaching pool may be eliminated.



This arrangement should be used where the sewage installation is on a hillside or where the ground slopes steeply. The absorption bed is laid in long horizontal lines as indicated, at different levels on the side of the hill. The short lines carry the effluent from the one level to the next one below.



lations. They are provided with two manhole openings, one over the inlet and the other over the outlet end. They are covered with heavy gauge metal manhole covers held in place by bolts and nuts.

In construction details the tanks follow the specifications of the U. S. Public Health Service. They have properly designed inlet and outlet baffles as well as a sludge baffle as shown in cross-sectional illustration. The inlet and outlet baffles are of correct size and capacity and both the inlet and outlet connections in the tank are provided with stops that make it impossible to shove the tile so far in that the opening is obstructed.

### How to Install

The installation of an F-M Septic Tank presents no difficulties whatever.

The tank should be installed at least 5 feet (preferably 10

feet) away from the building which it serves and should be at least 50 feet from any natural water supply such as a spring or well.

Tank should have a top cover of not more than 27" of earth. In most sections of the United States a cover of 12" will keep the tank at a suitable temperature for bacterial action.

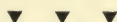
The drain from the house to the tank should be 4" or 6" sewer tile with tight joints. The small end of a 4" sewer tile will slip inside of the tank connection, or the bell end of a 6" tile will slip over the outside of the connection. Grade  $\frac{1}{4}$ " to the foot.

*Be sure the intake is piped to the higher opening in the tank as shown in the cross-sectional view. The tank will not operate properly if the connections are reversed.*

The drain tile from the tank should be laid about 12" to 16"

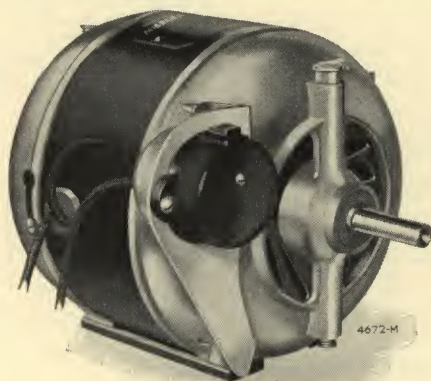
below the surface so that the sunlight and purifying bacteria of the top soil will act upon the effluent. The first 3 or 4 lengths of the drain tile should be laid on a steep grade (about  $\frac{1}{4}$ " to the foot) with tightly made joints. After this the line should be flattened out to a grade of 6" to 100 feet, from which the parallel rows of ordinary unglazed farm drain tile, 6 feet apart, should be laid with the ends butted together, resting on a brick or stone. Leave about  $\frac{1}{4}$ " space between each section of tile. Cover the top of each joint with a strip of tar paper 4" wide.

The branch lines should have a slope of about 6" to the 100 feet in sandy soil; not more than 3" to the 100 feet in tight clay soil. The branch lines should not be more than 100 feet long except in hilly localities where the line is coiled like a snake. (See Figure 80 on the previous page.)





## MOTORS FOR FAIRBANKS-MORSE WATER SYSTEMS



Motor with Protective Relay mounted on bracket. This method of mounting is used on the motors for the 200, 210, 400 and 420 gallon plants. On the motor for the 250 and 500 gal. plants the relay is mounted on the side of the conduit box on top of the motor.

The prices below cover special Fairbanks-Morse high torque motors as regularly supplied for Home Water Plant replacement service.

H.P.	Speed	Type	Volts	Cycles	Phase	Frame	Approx. Shpg. Wt., Lbs.	PRICE F. O. B. BELOIT						
								Bare Motor	Additions For:				Motor Complete	
									Pulley or Sheave	*Fan and Guard	Protective Relay	**Adapter Plates	Outfit No.	Price

### Motors for 210 Shallow Well Gallon Plants

1/4	1725	SRB	110	60	1	5815	30	\$18.30	\$ .50	\$ .30	\$2.25	\$ .60	7039	\$21.95
1/4	1725	SRB	110—220	60	1	5815	30	18.60	.50	.30	2.25	.60	7040	22.25
1/4	1425	SRB	110—220	50	1	5815	30	20.35	.70	.30	2.25	.60	7041	24.20
1/4	1425	SRB	110—220	25	1	5815	30	25.45	.70	.30	2.25	1.00	7042	29.70
1/4	1725	SDB	32	D.C.	.....	5815	30	18.80	.50	.30	.....	.60	7043	20.20
1/4	1725	SDB	115	D.C.	.....	5815	30	18.80	.50	.30	.....	.60	7044	20.20
1/4	1725	SDB	230	D.C.	.....	5815	30	20.30	.50	.30	.....	.60	7045	21.70

### Motors for 200 Gallon "Challenger" or Old Style 200 Gallon Plants (Specify Which)

1/6	1725	SRB	110—220	60	1	5815	30	15.45	.80	Not Furnished	2.25	1.85	7047	20.35
1/6	1425	SRB	110—220	50	1	5815	30	16.65	.80		2.25	1.85	7048	21.55
1/6	1425	SRB	110—220	25	1	5815	30	24.50	.80		2.25	2.25	7049	29.80
1/6	1725	SDB	32	D.C.	.....	5815	30	19.05	.80		.....	1.85	7050	21.70
1/6	1725	SDB	115	D.C.	.....	5815	30	19.05	.80		.....	1.85	7051	21.70
1/6	1725	SDB	230	D.C.	.....	5815	30	20.65	.80		.....	1.85	7052	23.30

### Motors for 250 Gallon and 500 Gallon Plants

Bare motor price includes conduit box with Greenfield fitting mounted on top of motor. Pressure switch not included.

H.P.	Speed	Type	Volts	Cycles	Phase	Frame	Approx. Shpg. Wt., Lbs.	PRICE F. O. B. BELOIT				
								Bare Motor	Addition For:		Motor Complete	
									Sheave	Protective Relay	Outfit No.	Price

### Motors for 250 Gallon Shallow Well Plants

1/4	1725	SRB	110—220	60	1	5822	30	21.60	.50	2.25	8009	24.35
1/4	1425	SRB	110—220	50	1	5822	30	23.35	.70	2.25	8010	26.30
1/4	1425	SRB	110—220	25	1	5827	30	28.45	.70	2.25	8011	31.40
1/4	1725	SDB	32	D.C.	.....	5822	30	21.80	.50	.....	8012	22.30
1/4	1725	SDB	115	D.C.	.....	5822	30	21.80	.50	.....	8013	22.30
1/4	1725	SDB	230	D.C.	.....	5822	30	23.30	.50	.....	8014	23.80

### Motors for 500 Gallon Shallow Well Plants

1/2	1725	SRB	110—220	60	1	5830	40	28.30	.70	2.25	8016	31.25
1/2	1425	SRB	110—220	50	1	5830	40	31.00	.70	2.25	8017	33.95
1/2	1425	SRB	110—220	25	1	5830	40	39.00	.70	2.25	8018	41.95
1/2	1725	SDB	32	D.C.	.....	5830	40	33.00	.70	.....	8019	33.70
1/2	1725	SDB	115	D.C.	.....	5830	40	32.00	.70	.....	8020	32.70
1/2	1725	SDB	230	D.C.	.....	5830	40	33.00	.70	.....	8021	33.70

\*When pressure switch is to be included, add \$5.90 list to these prices. The pressure switch is regularly mounted on top of the conduit box in the case of the motors for the 250 and 500 gallon plants.



MOTORS FOR FAIRBANKS-MORSE WATER SYSTEMS

H.P.	Speed	Type	Volts	Cycles	Phase	Frame	Approx. Shpg. Wt., Lbs.	PRICE F. O. B. BELOIT						
								Bare Motor	Additions For:				Motor Complete	
									Pulley or Sheave	*Fan and Guard	Protective Relay	**Adapter Plates	Outfit No.	Price

Motors for 420 Gallon Shallow Well Plants

1/2	1725	SRB	110	60	1	5830	40	\$25.00	\$ .70	\$ .30	\$2.25	\$1.25	7053	\$29.50
1/2	1725	SRB	110—220	60	1	5830	40	25.30	.70	.30	2.25	1.25	7054	29.80
1/3	1425	SRB	110—220	50	1	5830	40	25.30	.70	.30	2.25	1.25	7055	29.80
1/3	1425	SRB	110—220	25	1	5830	40	29.15	.70	.30	2.25	1.25	7056	33.65
1/2	1725	SDB	32	D.C.	.....	5830	40	30.00	.70	.30	.....	1.25	7057	32.25
1/2	1725	SDB	115	D.C.	.....	5830	40	29.00	.70	.30	.....	1.25	7058	31.25
1/2	1725	SDB	230	D.C.	.....	5830	40	30.00	.70	.30	.....	1.25	7059	32.25

Motors for Old Style 400 Gallon Shallow Well Plants

1/2	1725	SRB	110	60	1	5830	40	25.00	.95	Not Furnished	2.25	1.25	7060	29.45
1/2	1725	SRB	110—220	60	1	5830	40	25.30	.95		2.25	1.25	7061	29.75
1/3	1425	SRB	110—220	50	1	5830	40	25.30	.95		2.25	1.25	7062	29.75
1/3	1425	SRB	110—220	25	1	5830	40	29.15	.95		2.25	1.25	7063	33.60
1/2	1725	SDB	32	D.C.	.....	5830	40	30.00	.95		.....	1.25	7064	32.20
1/2	1725	SDB	115	D.C.	.....	5830	40	29.00	.95		.....	1.25	7065	31.20
1/2	1725	SDB	230	D.C.	.....	5830	40	30.00	.95		.....	1.25	7066	32.20

Motors for Old Style 120 Gallon Shallow Well Plants

1/8	1725	RA	110	60	1	5815	26	15.85	.60	.....	.....	.....	7067	16.45
1/8	1725	RA	110—220	60	1	5815	26	16.15	.60	.....	.....	.....	7068	16.75
1/8	1425	RA	110—220	50	1	5815	26	16.15	.60	.....	.....	.....	7069	16.75
1/8	1425	RA	110—220	25	1	5815	26	22.70	.60	.....	.....	.....	7070	23.30
1/8	1725	DM	32	D.C.	.....	3015	26	18.50	.60	.....	.....	.....	7071	19.10
1/8	1725	DM	115	D.C.	.....	3015	26	18.50	.60	.....	.....	.....	7072	19.10
1/8	1725	DM	230	D.C.	.....	3015	26	20.00	.60	.....	.....	.....	7073	20.60

\*The fan and fan guard is necessary only on the 210 and 420 gallon pumps enclosed in the sheet steel housing.

The following table gives detailed information concerning the Adapter Plates required for the various motors listed in the foregoing table:

Adapter Plates

Size Water Plant	Motor Frequency	No. of Adapter Plates Required	Symbol Numbers	Price Each
210 G.P.H.	50 and 60 cycle and all D.C.	2	{ 1-M-20100 1-M-20109	.30 .30
210 G.P.H.	25 cycle	2	{ 1-M-20247 1-M-20248	.50 .50
200 G.P.H.	50 and 60 cycle and all D.C.	3	{ 1-M-20100 1-M-20109 1-PBD4374A	.30 .30 1.25
200 G.P.H.	25 cycle	3	{ 1-M-20247 1-M-20248 1-PBD4374A	.50 .50 1.25
250 G.P.H.	No adapter plates necessary			
500 G.P.H.	No adapter plates necessary			
420 G.P.H.	All frequencies and D.C.	1	1-P2AB4374A	1.25
400 G.P.H.	All frequencies and D.C.	1	1-PCD4374A	1.25
120 G.P.H.	No adapter plates are required with the RA and DM type motors used for replacements on the old 120 G.P.H. plant.			

**OVERLOAD AND LOW-VOLTAGE RELAY:**—This protective feature is furnished as regular equipment with all shallow well water plant complete motor replacements priced above except in the case of the 1/8 H.P. motors listed for the old 120 gallon plant; also except in the case of the direct current motors (32, 115 or 230 volts) furnished for the 210, 200, 250, 420 and 500 G.P.H. plants.

The overload relay is not regularly furnished with direct current motors because direct current motors automatically adjust themselves somewhat to an overload by slowing down in speed, making line protection less necessary. Furthermore, a much more expensive type of relay would be required for direct current to take care of the heavy arcing that takes place when a direct current circuit is broken.

The protective relay is not furnished with vertical motors for the Type "DC" Deep Well Head listed on next page.

**EXPORT IMPREGNATION:**—If the motors are wanted with special impregnation of coils to withstand attack of salt water atmosphere or that of warm, humid climates, add \$1.50 per motor and specify "with export impregnation."



### VERTICAL MOTORS FOR TYPE "DC" DEEP WELL PLANTS

H.P. Rating Plant	Actual H.P. of Oversize Motor	Speed	Volts	Cycles	Phase	*Present Frame No.	Old Frame No.	Approx. Shpg. Wt., Lbs.	Outfit No.	Price F.O.B. Beloit
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#### Vertical Motors (Oversize) for 1/4 H.P. "DC" Deep Well Plants

1/4	1/8	1725	110—220	60	1	5827	5827	45	5343	\$ 37.50
1/4	1/8	1425	110—220	50	1	5827	5827	45	5344	37.50
1/4	1/8	1125	110—220	40	1	5830	5830	45	5345	37.50
1/4	1/8	1725	110—220	30	1	5827	5827	45	5346	37.50
1/4	1/8	1425	110—220	25	1	5827	5827	45	5347	37.50
1/4	1/8	1725	32	D.C.	.....	3027	3027	45	5340	37.50
1/4	1/8	1725	115	D.C.	.....	3027	3027	45	5341	37.50
1/4	1/8	1725	230	D.C.	.....	3027	3027	45	5342	37.50

#### Vertical Motors (Oversize) for 1/2 H.P. "DC" Deep Well Plants

1/2	3/4	1725	110—220	60	1	7425	7425	65	5351	46.00
1/2	3/4	1425	110—220	50	1	7425	7425	65	5352	46.00
1/2	3/4	1125	110—220	40	1	7430	7425	65	5353	52.00
1/2	3/4	1725	110—220	30	1	7430	7427	65	5354	52.00
1/2	3/4	1425	110—220	25	1	7430	7427	65	5355	52.00
1/2	3/4	1725	32	D.C.	.....	4025	4025	65	5348	46.00
1/2	3/4	1725	115	D.C.	.....	4025	4025	65	5349	46.00
1/2	3/4	1725	230	D.C.	.....	4025	4025	65	5350	48.50

#### Vertical Motors (Oversize) for 3/4 H.P. "DC" Deep Well Plants

3/4	1	1725	110—220	60	1	7430	7427	75	5358	52.00
3/4	1	1425	110—220	50	1	7430	7427	75	5359	52.00
3/4	1	1125	110—220	40	1	7430	7430	75	5360	58.00
3/4	1	1725	110—220	30	1	7430	7430	75	5361	58.00
3/4	1	1425	110—220	25	1	7430	7430	75	5362	58.00
3/4	1	1725	32	D.C.	.....	4030	4027	75	7074	52.00
3/4	1	1725	115	D.C.	.....	4030	4027	75	5356	52.00
3/4	1	1725	230	D.C.	.....	4030	4027	75	5357	52.00

#### Vertical Motors for 2 H.P. "DC" Deep Well Plants

2	2	1725	110—220—440	60	3	11220	11220	195	7075	88.00
2	2	1425	110—220—440	50	3	11220	11220	195	7076	88.00
2	2	1125	110—220—440	40	3	11230	11230	195	7077	112.00
2	2	1725	110—220—440	30	3	11230W	11230	195	7078	112.00
2	2	1425	110—220—440	25	3	11230W	11230	195	7079	112.00
2	2	1725	110—220	60	1	11220	11220	195	5365	107.00
2	2	1425	110—220	50	1	11220	11220	195	5366	107.00
2	2	1125	110—220	40	1	11230	11230	195	5367	127.00
2	2	1725	110—220	30	1	11230W	11230W	215	5368	127.00
2	2	1425	110—220	25	1	11230W	11230W	215	5369	127.00
2	2	1725	32	D.C.	.....	.....	.....	Not Furnished		.....
2	2	1725	115	D.C.	.....	6220	6220	200	5363	107.00
2	2	1725	230	D.C.	.....	6220	6220	200	5364	107.00

#### Vertical Motors for 3 H.P. "DC" Deep Well Plants

3	3	1725	110—220—440	60	3	11230	11230	210	7080	103.00
3	3	1425	110—220—440	50	3	11230	11230	210	7081	103.00
3	3	1125	110—220—440	40	3	11240	11240	230	7082	127.00
3	3	1725	110—220—440	30	3	11240	11240	230	7083	127.00
3	3	1425	110—220—440	25	3	11240	11240	230	7084	127.00
3	3	1725	110—220	60	1	11230	11230	210	5372	127.00
3	3	1425	110—220	50	1	11230	11230	210	5373	127.00
3	3	1125	110—220	40	1	11240	11240	230	5374	152.00
3	3	1725	110—220	30	1	11240	11240	230	5375	152.00
3	3	1425	110—220	25	1	11240	11240	230	5376	152.00
3	3	1725	32	D.C.	.....	.....	.....	Not Furnished		.....
3	3	1725	115	D.C.	.....	6230	6230	205	5370	127.00
3	3	1725	230	D.C.	.....	6230	6230	205	5371	127.00

\*Where frame size has been changed, the only repair parts affected are armature and field windings.



## SPECIAL MOTORS AND CONTROL EQUIPMENT

The motor furnished as standard with all Fairbanks-Morse Water Systems is for operation on a 60 cycle, 110 volt single phase circuit. (The only exception to this is Outfit 5075-M (5000 gal. Typhoon), which is regularly supplied with a 7 1/2 H.P., 3 phase motor instead of a single phase.)

**NOTE:**—When any of the following Typhoon motor driven combinations are wanted with a motor other than 110-220 volt single phase 60 cycle, add \$10.00 to the list price of the pump unit (in addition to the special motor charge) to cover extended steel base and adapter plates to receive the special motor:

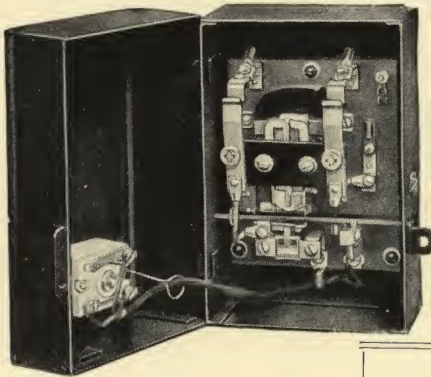
6075-T—600 gal. Typhoon and 3/4 H.P. motor (top mounted)  
1001-T—1000 gal. Typhoon and 1 H.P. motor (top mounted)  
1502-T—1500 gal. Typhoon and 2 H.P. motor (top mounted)

All other Typhoon Pump combinations are regularly furnished with extended base as standard. In such cases this \$10.00 addition will not apply.

Where direct current motors are desired, or motors for operation on other than 60 cycle circuits, make the following net additions to the standard price of the pump unit:

### Net Addition to Dealer or Consumer Prices Where Special Motors are Involved (Read Important Notice Below Concerning Secondary Starters Required with Some of These Motors)

H.P.	50 Cycle Single Phase 110 or 220 Volts		25 or 30 Cycle Single Phase 110 or 220 Volts		Direct Current						3 Phase				
	Type	Extra Charge	Type	Extra Charge	32 Volts		115 Volts		230 Volts		50 or 60 Cycle 220, 440 or 550 Volts			25 or 30 Cycle	
					Type	Extra Charge	Type	Extra Charge	Type	Extra Charge	Type	Extra Charge 220 Volts	Extra Charge 440 or 550 Volts	Type	Extra Charge 220 Volts
1/8	.....	\$1.00	.....	\$6.00	.....	\$2.00	.....	\$2.00	.....	\$4.00	.....	.....	.....	.....	.....
1/6	.....	1.50	.....	7.75	.....	2.50	.....	2.50	.....	5.00	.....	.....	.....	.....	.....
1/4	.....	2.00	.....	6.50	.....	2.00	.....	2.00	.....	2.00	.....	\$2.00	\$6.50	.....	\$6.00
3/8	SRB	2.00	SRB	8.50	SDB	4.00	SDB	4.00	SDB	5.50	SNB	5.00	10.00	SNB	8.00
1/2	SRB	2.50	SRB	9.50	SDB	4.50	SDB	4.50	SDB	4.50	SNB	3.00	5.50	SNB	5.50
3/4	SRB	2.50	SRB	9.50	SDB	4.50	SDB	4.50	SDB	4.50	SNB	2.00	2.00	SNB	7.50
1	SRB	No Extra	.....	20.00	.....	.....	SDB	2.00	SDB	2.00	SNB	Deduct \$ 4	Deduct \$ 4	Q	10.00
2	SPB	No Extra	.....	26.50	.....	.....	DH	13.00	DH	13.00	Q	Deduct \$15	Deduct \$15	Q	No Extra
3	SPB	No Extra	.....	49.00	.....	.....	DH	13.00	DH	13.00	Q	Deduct \$15	Deduct \$15	Q	No Extra
5	SPB	No Extra	.....	96.00	.....	.....	DH	30.00	DH	30.00	Q	Deduct \$50	Deduct \$50	Q	Deduct \$10
7 1/2	.....	No Extra	.....	.....	.....	.....	.....	.....	.....	.....	Q	Std. with pump	No Extra	.....	Add \$64



Above: Cat. No. 8536 Secondary Starter

### IMPORTANT NOTICE

When direct current motors 3/4 H.P. and larger are used, it is necessary to install a secondary starter in addition to the regular pressure switch, to guard against armature burn-outs and excessive sparking at the brushes during the starting period.

A secondary starter is also necessary in the case of the 5 and 7 1/2 H.P. ratings, as well as in the case of the 3 H.P., 110 volt, single phase rating. The prices of the secondary starter equipment can be found below for those motor ratings requiring the use of a starter. Be sure to include the starter (when required) in your quotation, unless customer wishes to secure this part of the equipment elsewhere.

### Prices of Control Equipment for Motors Requiring More Than the Standard Pressure Control Switch No. 9014

F. O. B. Milwaukee, Wisconsin

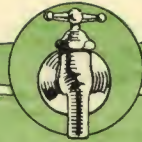
	*PRESSURE SWITCH		SECONDARY STARTER (Overload and Low Voltage Release Included)		Total Price
	Catalog Number	Price	Catalog Number	Price	
<b>SINGLE PHASE:</b>					
3 H.P.—110 volt	9014	\$7.00	8533	\$20.00	\$27.00
5 H.P.—110 volt	9014	7.00	8537	48.00	55.00
5 H.P.—220 volt	9014	7.00	8533	20.00	27.00
<b>THREE PHASE:</b>					
5 H.P.—110 volt	9014	7.00	8536	36.00	43.00
5 H.P.—220 volt	9014	7.00	8536	36.00	43.00
7 1/2 H.P.—110 volt	9014	7.00	8536	36.00	43.00
7 1/2 H.P.—220 volt	9014	7.00	8536	36.00	43.00
7 1/2 H.P.—440 volt	9014	7.00	8532	20.00	27.00
<b>DIRECT CURRENT:</b>					
3/4 H.P.—32 volt	9014	7.00	7107	46.00	53.00
1 H.P.—115 volt	9014	7.00	7107	46.00	53.00
2 H.P.—115 volt	9014	7.00	7107	46.00	53.00
3 H.P.—115 volt	9014	7.00	7107	46.00	53.00
5 H.P.—115 volt	9014	7.00	7110	55.00	62.00
1 H.P.—230 volt	9014	7.00	7107	46.00	53.00
2 H.P.—230 volt	9014	7.00	7107	46.00	53.00
3 H.P.—230 volt	9014	7.00	7107	46.00	53.00
5 H.P.—230 volt	9014	7.00	7107-5	53.50	60.50

\*The No. 9014 pressure switch is good for a maximum pressure of 65 lbs. For 100 lbs. pressure, use the No. 9013 which is \$2.00 higher in price. Except in the cases of motors listed in the table above, all that is necessary to automatically start and stop the motor furnished with any of our Types B, C, or "DC" Deep Well water systems or any of our Self-Oiling Typhoon combinations is the ordinary No. 9014 pressure switch (for 65 lbs. maximum pressure), or the No. 9013 switch (for 100 lbs. maximum pressure) plus the No. 9020 thermal relay if overload and low voltage protection is desired. The price of the No. 9020-B relay is \$4.50. (For 3 phase motors use the No. 9020-A relay instead of the No. 9020-B—Price \$9.00.)

**How to Order:**—In ordering give catalog number of the switch or starter desired and in addition give the horsepower, voltage, phase and cycles (if alternating current), and the full load current rating of the motor, if known. (The full load current is usually given on the motor nameplate.) Also specify the "cut in" and "cut-out" pressure for which the switch is to be adjusted.

A stock of the pressure switches 9013 and 9014 is kept on hand at the Beloit factory for immediate shipment.





## ENGINEERING DATA AND USEFUL INFORMATION

Fairbanks-Morse Water Systems are easy to sell. It isn't necessary to do a lot of calculating or figuring before the proper size water system can be selected for the job because these computations are already made for you in the very complete capacity and price tables appearing throughout this catalog.

The pages following will give you some interesting supplementary information of a general engineering character which will help you in specific problems that might come up from time to time. In addition, individual Instruction Books are available for each of the various models and will be found to contain much valuable information on the installation, care and operation of the pump in service.





# Information About Water Storage Tanks



## Two Methods of Storing Water

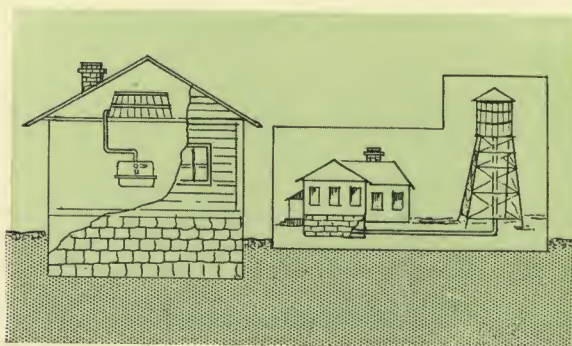
The two general methods of storing water are by means of the overhead gravity tank and the pressure tank.

When we speak of two methods of storing water we have in mind, of course, storing water under conditions that will give it the necessary pressure to flow out of the faucet when the faucet is opened.

It is a well-known fact that before energy can be secured from anything, energy must first be put into it. Water is incompressible—it is not elastic. It does not behave like a gas, therefore compression is a poor way of storing energy in water. Energy can be stored in water, however, by elevating it a considerable distance from the earth. It will have stored in it, due to the law of gravity acting upon its weight, a certain potential energy because of its elevation. This energy is called “static head,” and the higher the water is stored the greater will be its “head” which is either expressed in feet (meaning the feet elevation) or in pounds per square inch. There is a very definite relation between the two, which is as follows:

A column of water one foot in height exerts a pressure of .43 pounds per square inch at

its base; or, what is the same thing—for every 2.31 feet in the height of a column of water a



pressure of 1 pound per square inch can be secured.

It can be seen from the above that in order to get a 10 pound pressure on the water at the faucet it is necessary to elevate the water  $10 \times 2.31$ , or 23.1 feet.

This method of storage is called the “overhead” or “gravity tank” system. It has several disadvantages. In the first place, it is impossible to get a good pressure without storing the tank on a windmill tower or some other place a considerable distance above the point of usage. If the tank is placed on a windmill tower, it will freeze in the winter time; if it is placed in the attic, the water will not have much pressure; the tank is apt to leak if a wood tank is used, and if a steel tank is employed, it will “sweat” in the summer time, necessitating the use of drip pans. Also, in the summer time the water in

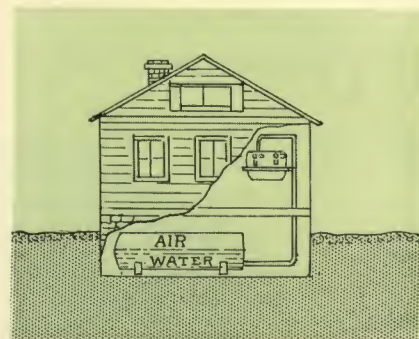


Fig. 85. Above: Pneumatic or pressure tank. At left: Overhead or gravity tank.



the tank will get warm, making it unsatisfactory for drinking purposes. Further, a tank large enough to serve the average family puts a tremendous strain on the building; there is always danger of leakage, and, although the tanks are usually covered, they are not sealed, with the result that considerable dirt and dust find their way into the tank, contaminating the water. Overhead tanks are seldom installed nowadays, even though a suitable tower is already available, as shown in the sketch, because of the various disadvantages, as well as the expense of installation.

## The Pneumatic Tank

A much more popular system of water storage is the pneumatic tank. Here an air-tight tank is used for the storage and a cushion of air is kept at the top of the tank. Air is elastic



—it can be compressed to occupy a very small fraction of its original space; in fact it can be compressed to a point of liquification, although this, of course, never takes place at anything like the pressures employed in a pneumatic tank. The big advantage of air, however, is that, again because of its elasticity, when the pressure is relieved, or, in other words, when the faucet is opened, the air will expand. In endeavoring to get back to its original or atmospheric volume it will force the water before it in the pipes to any discharge opening there may be in the system, provided the faucet is not at a point too high for the pressure in the tank. Here again we come back to our previous rule, namely, 1 pound per square inch is equal to a 2.31 foot elevation. 40 pounds per square inch in the tank, therefore, will raise water 40x2.31 or 92.40 feet provided there were no friction in the pipe.

There is always friction in pipe, however, so that the "loss of head" due to friction should be deducted. This can be secured from table No. 1 in the engineering section located in the back of this catalog. For instance, if you had a  $\frac{3}{4}$  inch discharge pipe 100 feet long and you had water flowing at the rate of 3 gallons per minute, the loss of head due to friction in the pipe (from table) would be 4.1 feet. In other words, the 40 pound tank pressure would raise the water a vertical distance of 92.4 less 4.1, or 88.3 feet. For all practical calculations it may be assumed that 1 pound of pressure will

elevate water 2 feet instead of 2.31.

The pneumatic or pressure tank has several advantages over the overhead tank. In the first place, it may be installed in the basement or some other convenient place and eliminate possible damage to the ceiling because of "sweating." Pneumatic tanks are pressure tested and are not nearly so apt to spring a leak as the wood or light gauge steel tanks; and, lastly, they are completely enclosed so that the water while in storage is protected from dust, dirt and other contamination.

### How To Select The Proper Size Tank To Use

It is advisable to select a tank of sufficient capacity to give the customer the reserve capacity you think he will need to carry him over a period of shut down in case of failure of the electric current which frequently occurs during a severe storm.

There are other cases where the demand for water is comparatively heavy but only for intermittent and short periods. In a case of this kind a storage tank of large capacity might be used in connection with a relatively small pump.

There are other cases where the demand is heavy for relatively long periods—for instance those cases where there is apt to be daily sprinkling with a number of sprinklers for perhaps an hour or more. About 200 gallons per hour is required to feed a sprinkler, so if there are three sprinklers to be used it would be preferable to install a 600 gallon pump unit and a

relatively small tank rather than a 210 gallon pump unit and a 1000 gallon tank.

### Working Capacities Of Tanks

It must be borne in mind that you do not get 1000 gallons of water out of a 1000 gallon tank between the pressure limits of 40 and 20 pounds. In the first place the tank, if properly regulated has about one-third of its capacity devoted to the storage of air. This leaves only 666 gallons of water to start with.

In the second place, the customer does not completely drain his tank but instead when the pressure reaches say 20 pounds the pump automatically starts to operate. Furthermore the discharge outlet is always higher than the extreme bottom of the tank. This also influences the amount of water that can be secured from the tank between the customary 40-20 pound pressure limits.

It can be roughly stated that, with  $\frac{1}{3}$  of the tank volume occupied with air when the pressure stands at the maximum of 40 pounds, approximately  $\frac{1}{5}$  of the full capacity of the tank can be drawn before the pressure falls to 20 pounds. In other words, a 1000 gallon tank will discharge 200 gallons of water before the pump cuts in; a 220 gallon tank about 45 gallons of water, etc.

### When To Sell A Fresh Water Unit

Deep Well Pumps are occasionally installed without a storage tank but with a large air chamber for what is called "Fresh Water Service."



This outfit is satisfactory for use where the water requirements are light such as in a small summer cottage, a filling station or for drinking water only. The absence of a tank makes it a very compact system and the flexibility of the piping permits of mounting the air chamber either in the position shown in the cut or the piping with air chamber can be run along side the pump base, whichever is more convenient.

The fresh water outfit may be used in connection with an overhead storage tank, filling the tank once or twice a day perhaps, for general water service requirements and using the direct water system at other times simply for drinking water purposes. The water in the air chamber will always be cold for this purpose.

For other service a storage tank is always preferable on a deep well installation. Even a system with a 35 gallon tank would be better than the air chamber installation if space will permit the installation of a tank because the larger the storage capacity the more the ability of the tank to absorb load fluctuations.

For instance take a fresh water system that has a capacity of say 415 gallons per hour. If a faucet were partially opened so that it would deliver say only 150 gallons an hour it would mean that the pressure in the air chamber would continually build up and drop causing the switch to start and stop the system repeatedly as long as the

faucet is opened. This would always happen unless the outlet took the entire capacity of the pump. If the pump had a capacity of 415 gallons per hour the outlets would have to absorb the entire 415 gallons per hour or the frequent stopping and starting would take place.

A storage tank on the other hand—even one of 35 gallons capacity would have sufficient capacity to take care of most of the water requirements around the home. It takes only about 5 gallons for instance to flush a toilet. The valve in a toilet tank is very small so that a fresh water unit might start and stop two or three times while the flushing process is in operation while a tank outfit would take care of it without a start at all unless the tank pressure happened to be very low at the time. In that case the pump would start, but only once and at the same time it would be replenishing the water in the tank.

### Systems With Exceptionally Large Storage Capacity

Quite frequently a prospect will want a water system with unusually large storage capacity to use either for emergency demand in the case of fire or for peak sprinkling loads in the summer time. Many houses are being erected in the outlying suburbs or along the fringe of golf courses in which water systems of this kind are required.

A 5000 gallon storage tank is a clumsy thing to handle. If it has to be frost-proofed—and most of them do—it means an

exceptionally deep hole is required to sink them if they are put in the ground or an unwarrantably large space required to place them in a building.

A great many installations with large storage capacity have been installed by Fairbanks-Morse engineers for residences in the metropolitan suburban districts in which the tank problem has been solved in a way that invariably meets with the approval of the owner. A layout of a typical installation is shown on the next page.

In this particular case three 1000 gallon tanks were used in multiple in connection with a 3 H.P. F-M Type "DC" Deep Well Pump. By a simple manipulation of the valves the three tanks can be pumped full, after which all but one can be shut off to be held in reserve for emergency service. If the piping is properly done they will hold their pressure indefinitely. A pressure gauge should be installed on each tank so that the pressure may be observed from time to time as a check.

With this system there is in regular service only one storage tank of 1000 gallons capacity, which in itself has two distinct advantages.

1. In the first place it gives the customer a more frequent "turnover" of water for his regular service requirements. The water in daily use therefore is not allowed to become stale.

2. In large tanks of 1000 to 5000 gallons capacity it is usually difficult to maintain the proper volume of air without the use of an auxiliary air com-



pressor. In tanks 1000 gallons and smaller the maintenance of the proper air volume is a comparatively simple matter.

### Fresh Water Attachment

Where large storage tanks are used frequently the customer will want to install the fresh

water attachment so that he can get drinking water directly from the well.

Fairbanks-Morse Water Sys-

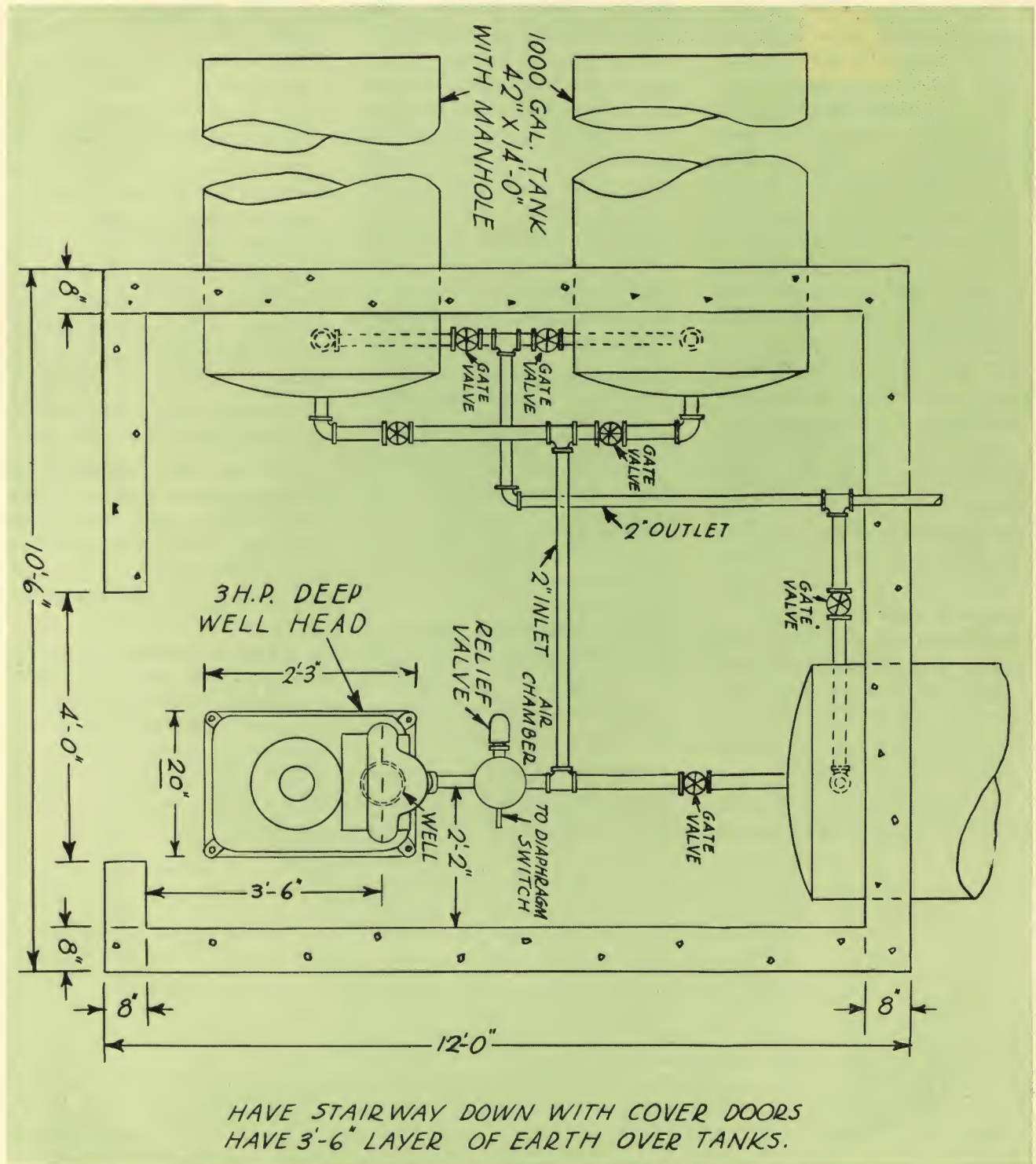


Fig. 86. Deep well pit layout illustrating the use of three 1000 gallon tanks in multiple to get reserve emergency storage capacity.



tems are priced both with and without the fresh water valve. When the fresh water attachment is used it necessitates changing the position of the pressure switch in the standard layout from the tank to the pump side of the fresh water valve. On deep well systems it is desirable to pipe the air compressor outlet to the tank side of the fresh water valve to prevent the fresh water pipe itself from acting in the capacity of an air chamber and mixing the air with the fresh water. The underslung pipe connection shown in the sales illustrations will help materially to direct the passage of the air into the tank where it properly belongs.

Fresh water attachments are not recommended for large size pumps with tanks smaller than 220 gallons capacity for two reasons. In the first place, bearing in mind the working capacity of a tank between the 40 and 20 pound limits is only about  $\frac{1}{5}$  of its rated capacity, a fresh water valve is hardly necessary because the water in the tank never gets an opportunity to become stale.

Secondly, bearing in mind a faucet will discharge at the rate

of say only 200 gallons per hour if you have a 600 gallon pump with fresh water attachment it means when the fresh water faucet is opened and the pump starts to operate the pump will deliver water at the rate of 400 gallons per hour while the faucet is open, and when the faucet is closed, at the rate of 600 gallons per hour to the storage tank until the pressure is reached at which the pressure switch will "cut out." You can readily appreciate if a small tank is used and the fresh water faucet opened ten or fifteen times during the day—even for only a minute or so at a time—there is a chance that over-pressure will be built up a little at a time in the storage tank, particularly if no water is drawn from the tank in the meantime. If water is drawn from the storage tank occasionally there is no chance of this over-pressure developing even if the fresh water faucet is opened very frequently throughout the day. A large tank will absorb irregularities of this sort much better than a small one.

Take an extreme case. Suppose a No. 6 deep well head with a capacity of 415 gallons

per hour were installed with a 35 gallon storage tank and a fresh water attachment from which a pipe is run to supply a drinking fountain at a filling station which is used perhaps eight or ten times per hour.

Being on the fresh water line every time the drinking fountain is turned on the pump will start to operate. The drinking fountain will take only about a gallon a minute so the rest of the pump capacity must go into the tank with the result that after a few hours the tank pressure may build up beyond the normal maximum and place too heavy a load on the motor as well as more than the normal operating pressure on the tank.

The case just illustrated is an ideal place to put in a Fresh Water Unit with large air chamber. The drinking fountain may be opened as often as desired without any chance of over-pressure developing. The air chamber, having a capacity of  $6\frac{1}{2}$  gallons, will supply several drinks between pump operations. With this system cold water from the air chamber is always available at the fountain with only an occasional start and stop of the pump unit.





# Useful Engineering Tables and Data For Your Convenience



## Water Requirements for Domestic Service



Below are the figures which have been accepted by the National Association of Water System Manufacturers as representing a fair estimate of actual water requirements:

Per Day

Each member of the family .....	25 gals.
Each horse.....	10 gals.
Each cow.....	12 gals.
Each hog.....	2 gals.
Each sheep.....	1½ gals.

Continuous flowing drinking fountains...50-100 G.P.H.  
½" Nozzle.....200 G.P.H.  
¾" Nozzle.....275-300 G.P.H.  
Lawn sprinkler.....120 G.P.H.

Cows giving milk drink about three times as much water as dry cows. Figure 25 to 35 gallons per day.

In addition, the following figures might be of assistance in further estimating:



## Home Fixtures

Gallons

Filling an ordinary lavatory .....	1½
Water required for a bath .....	30
Flushing a toilet.....	6
Ordinary shower bath.....	30

The water requirements will vary somewhat with the individual and likewise with the season of the year. Obviously in the summer time more water is used than in the cold winter months. Some individuals will require 50-100 gallons of water a day in the extreme hot weather.

TABLE No. 1—FRICTION OF WATER IN PIPES  
LOSS OF HEAD IN FEET DUE TO FRICTION, PER 100 FEET OF ORDINARY IRON PIPE

Gal's per Min.	¼ Inch Pipe	⅜ Inch Pipe	½ Inch Pipe	¾ Inch Pipe	1 Inch Pipe	1¼ In. Pipe	1½ In. Pipe	2 Inch Pipe	2½ In. Pipe	3 Inch Pipe	4 Inch Pipe	5 Inch Pipe	6 Inch Pipe
	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.	Fric.
1	28.0	6.4	2.1										
2	103.0	23.3	7.4	1.9									
3	.....	47.0	15.8	4.1	1.26								
4	.....	78.0	27.5	7.0	2.14	0.57	0.26						
5	.....	.....	42.0	10.5	3.25	0.84	0.39						
10	.....	.....	.....	39.0	11.7	3.05	1.43	0.50	0.17	0.07			
15	.....	.....	.....	80.0	25.0	6.50	3.0	1.1	0.36	0.15			
20	.....	.....	.....	.....	44.0	11.1	5.2	1.82	0.61	0.25			
25	.....	.....	.....	.....	65.0	17.0	7.8	2.73	0.92	0.38			
30	.....	.....	.....	.....	92.0	24.5	11.0	3.90	1.29	0.54			
35	.....	.....	.....	.....	.....	32.0	14.7	5.1	1.72	0.71			
40	.....	.....	.....	.....	.....	41.0	18.8	6.6	2.20	0.91	0.22		
45	.....	.....	.....	.....	.....	52.0	23.2	8.2	2.80	1.15	0.27		
50	.....	.....	.....	.....	.....	65.0	29.0	10.1	3.32	1.38	0.33	0.11	
70	.....	.....	.....	.....	.....	.....	53.0	18.4	6.2	2.57	0.62	0.24	
90	.....	.....	.....	.....	.....	.....	84.0	30.0	9.8	4.08	1.0	0.33	0.13
100	.....	.....	.....	.....	.....	.....	102.0	38.0	12.0	4.96	1.20	0.40	0.16
120	.....	.....	.....	.....	.....	.....	.....	53.0	16.8	7.0	1.7	0.56	0.23
140	.....	.....	.....	.....	.....	.....	.....	70.0	22.3	9.2	2.25	0.75	0.30
160	.....	.....	.....	.....	.....	.....	.....	90.0	25.0	11.8	2.9	.95	0.39
180	.....	.....	.....	.....	.....	.....	.....	.....	35.7	14.8			
200	.....	.....	.....	.....	.....	.....	.....	.....	43.1	17.8			



TABLE No. 2—FRICTION OF WATER IN 90° ELBOWS  
EQUIVALENT NUMBER OF FEET STRAIGHT PIPE

Size of Elbows, Inches.....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6
Friction Equivalent Feet Straight Pipe.....	3	4	5	6	6	8	8	8	11	15	16	18	18

NOTE—The figures given are based on the assumption that the total velocity head of the water flowing through the elbow is used up to overcome the friction.



TABLE No. 3—FLOW OF WATER IN GALLONS PER MINUTE, DIFFERENT FIXTURES

Bath.....	10	Valve Closets.....	30	Laundry Tub.....	10
Lavatory.....	5	Shower.....	5	Garden Hose (3/4" Nozzle).....	5
Tank Closets.....	5	Sink.....	10	Continuous Drinking Fountain	1 1/2



TABLE No. 4—NUMBER OF GALLONS IN CISTERNS AND TANKS

Height in Feet	Diameter in Feet													
	5	6	7	8	9	10	11	12	13	14	15	16	18	20
1	146.8	211.4	287.8	375.9	475.9	587.5	710.7	848.2	992.6	1151.2	1321.5	1503.6	1903.0	2350.1
5	734.0	1057.0	1439.0	1879.5	2379.5	2937.5	3553.5	4241.0	4953.0	5756.0	6607.5	7518.0	9515.0	11750.5
6	880.8	1268.4	1726.8	2255.4	2855.4	3525.0	4264.2	5089.2	5955.6	6907.2	7929.0	9021.6	11418.0	14100.6
7	1027.6	1479.8	2014.6	2631.3	3331.3	4112.5	4974.9	5937.4	6948.2	8058.4	9250.5	10525.2	13321.0	16450.7
8	1174.4	1691.2	2302.4	3007.2	3807.2	4700.0	5685.6	6785.6	7940.8	9209.6	10572.0	12028.8	15224.0	18800.8
9	1321.2	1902.6	2590.2	3383.1	4283.1	5287.5	6396.3	7633.8	8933.4	10360.8	11893.5	13532.4	17127.0	21150.9
10	1468.4	2114.5	2878.0	3759.1	4759.0	5875.2	7107.0	8481.9	9926.3	11512.1	13215.5	15036.3	19030.3	23500.9



TABLE No. 5—HEAD AND PRESSURE EQUIVALENTS  
FEET HEAD OF WATER AND EQUIVALENT PRESSURES

Feet Head	Pounds Per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.
1	.43	30	12.99	140	60.63	300	129.93
2	.87	40	17.32	150	64.96	325	140.75
3	1.30	50	21.65	160	69.29	350	151.58
4	1.73	60	25.99	170	73.63	400	173.24
5	2.17	70	30.32	180	77.96	500	216.55
6	2.60	80	34.65	190	82.29	600	259.85
7	3.03	90	38.98	200	86.62	700	303.16
8	3.46	100	43.31	225	97.45	800	346.47
9	3.90	110	47.64	250	108.27	900	389.78
10	4.33	120	51.97	275	119.10	1000	433.09
20	8.66	130	56.30				

PRESSURES AND EQUIVALENT FEET HEAD OF WATER

Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head
1	2.31	20	46.18	120	277.07	225	519.51
2	4.62	25	57.72	125	288.62	250	577.24
3	6.93	30	69.27	130	300.16	275	643.03
4	9.24	40	92.36	140	323.25	300	692.69
5	11.54	50	115.45	150	346.34	325	750.41
6	13.85	60	138.54	160	369.43	350	808.13
7	16.16	70	161.63	170	392.52	375	865.89
8	18.47	80	184.72	180	415.61	400	922.58
9	20.78	90	207.81	190	438.90	500	1154.48
10	23.09	100	230.90	200	461.78	1000	2309.00
15	34.63	110	253.98				



TABLE No. 6—CAPACITY OF PUMP PER STROKE  
FIGURES ARE FOR ONE SINGLE ACTING CYLINDER

Diam. of Pump Cyl. in Inches	Cyl. Area, Sq. Inches	Length of Stroke in Inches and Capacity of Stroke in Gallons for Various Diameter Cylinders											
		1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	11"	12"
1 $\frac{3}{8}$	1.4849	.0064	.0128	.0192	.0257	.0321	.0385	.0449	.0514	.0578	.0642	.0707	.0771
1 $\frac{1}{2}$	1.7671	.0076	.0153	.0229	.0306	.0382	.0459	.0535	.0612	.0688	.0765	.0841	.0918
1 $\frac{5}{8}$	2.0739	.0089	.0179	.0269	.0359	.0448	.0538	.0628	.0718	.0808	.0897	.0987	.1409
1 $\frac{3}{4}$	2.4053	.0104	.0208	.0312	.0416	.0520	.0624	.0728	.0833	.0937	.1041	.1145	.1277
1 $\frac{15}{16}$	2.5802	.0111	.0223	.0335	.0446	.0558	.0670	.0781	.0893	.1005	.1116	.1228	.1340
2	3.1416	.0136	.0272	.0408	.0544	.0680	.0816	.0952	.1088	.1224	.1360	.1496	.1632
2 $\frac{1}{16}$	3.3410	.0144	.0289	.0433	.0578	.0723	.0867	.1012	.1157	.1301	.1446	.1590	.1735
2 $\frac{1}{8}$	3.5466	.0153	.0307	.0460	.0614	.0767	.0921	.1074	.1228	.1381	.1535	.1688	.1842
2 $\frac{3}{16}$	3.7583	.0162	.0325	.0488	.0650	.0813	.0976	.1138	.1301	.1464	.1626	.1789	.1952
2 $\frac{1}{4}$	3.9761	.0172	.0344	.0516	.0688	.0860	.1032	.1204	.1377	.1549	.1721	.1893	.2065
2 $\frac{15}{32}$	4.7867	.0207	.0414	.0621	.0828	.1036	.1243	.1450	.1657	.1864	.2072	.2297	.2486
2 $\frac{1}{2}$	4.9087	.0212	.0425	.0637	.0850	.1062	.1275	.1487	.1700	.1912	.2125	.2337	.2550
2 $\frac{5}{8}$	5.4119	.0234	.0468	.0702	.0937	.1171	.1405	.1639	.1874	.2108	.2342	.2577	.2811
2 $\frac{11}{16}$	5.6727	.0245	.0491	.0736	.0982	.1227	.1473	.1718	.1964	.2210	.2455	.2701	.2946
2 $\frac{3}{4}$	5.9396	.0257	.0514	.0771	.1028	.1285	.1542	.1799	.2057	.2314	.2571	.2828	.3085
2 $\frac{7}{8}$	6.4918	.0281	.0562	.0843	.1124	.1405	.1686	.1967	.2248	.2529	.2810	.3091	.3372
3	7.0686	.0306	.0612	.0918	.1224	.1530	.1836	.2142	.2448	.2754	.3060	.3366	.3672
3 $\frac{1}{16}$	7.3662	.0318	.0637	.0956	.1275	.1594	.1913	.2232	.2551	.2869	.3188	.3507	.3826
3 $\frac{1}{8}$	7.6699	.0332	.0664	.0996	.1328	.1660	.1992	.2324	.2656	.2988	.3320	.3652	.3984
3 $\frac{1}{4}$	8.2958	.0359	.0718	.1077	.1436	.1795	.2154	.2513	.2873	.3232	.3591	.3950	.4309
3 $\frac{1}{2}$	9.6211	.0416	.0833	.1249	.1666	.2082	.2499	.2915	.3332	.3748	.4165	.4581	.4998
3 $\frac{3}{4}$	11.045	.0478	.0956	.1434	.1912	.2390	.2868	.3346	.3824	.4302	.4781	.5259	.5737
4	12.566	.0544	.1088	.1632	.2176	.2720	.3264	.3808	.4352	.4896	.5440	.5984	.6528
4 $\frac{1}{4}$	14.186	.0614	.1228	.1842	.2456	.3070	.3684	.4298	.4913	.5527	.6141	.6755	.7369
4 $\frac{1}{2}$	15.904	.0688	.1377	.2065	.2754	.3442	.4131	.4819	.5508	.6196	.6885	.7573	.8262
4 $\frac{3}{4}$	17.721	.0767	.1534	.2301	.3068	.3835	.4602	.5369	.6137	.6904	.7671	.8438	.9205
5	19.635	.0850	.1700	.2550	.3400	.4250	.5100	.5950	.6800	.7650	.8500	.9350	1.0200
5 $\frac{1}{4}$	21.648	.0937	.1874	.2811	.3748	.4685	.5622	.6559	.7497	.8434	.9371	1.0308	1.1245
5 $\frac{1}{2}$	23.758	.1028	.2057	.3085	.4114	.5142	.6171	.7199	.8228	.9256	1.0285	1.1313	1.2342
6	28.274	.1224	.2448	.3672	.4896	.6120	.7344	.8568	.9792	1.1016	1.2240	1.3464	1.4688
6 $\frac{1}{4}$	30.680	.1328	.2656	.3984	.5312	.6640	.7968	.9296	1.0625	1.1953	1.3281	1.4609	1.5937
6 $\frac{1}{2}$	33.183	.1436	.2873	.4309	.5746	.7182	.8619	1.0055	1.1492	1.2928	1.4365	1.5801	1.7238
6 $\frac{3}{4}$	35.785	.1549	.3098	.4647	.6196	.7745	.9294	1.0843	1.2392	1.3941	1.5491	1.7040	1.8589
7	38.485	.1666	.3332	.4998	.6664	.8330	.9996	1.1662	1.3328	1.4994	1.6660	1.8326	1.9992
7 $\frac{1}{4}$	41.282	.1787	.3574	.5361	.7148	.8935	1.0722	1.2509	1.4297	1.6084	1.7871	1.9658	2.1445
7 $\frac{1}{2}$	44.179	.1912	.3825	.5737	.7650	.9562	1.1475	1.3387	1.5300	1.7212	1.9125	2.1037	2.2950
7 $\frac{3}{4}$	47.173	.2042	.4084	.6126	.8168	1.0210	1.2252	1.4294	1.6336	1.8378	2.0421	2.2463	2.4505
8	50.265	.2176	.4352	.6528	.8704	1.0880	1.3056	1.5232	1.7408	1.9584	2.1760	2.3936	2.6112
8 $\frac{1}{4}$	53.456	.2314	.4628	.6942	.9256	1.1570	1.3884	1.6198	1.8513	2.0827	2.3141	2.5455	2.7769
8 $\frac{1}{2}$	56.745	.2456	.4913	.7369	.9826	1.2282	1.4739	1.7195	1.9652	2.2108	2.4565	2.7021	2.9478
8 $\frac{3}{4}$	60.132	.2603	.5206	.7809	1.0412	1.3015	1.5618	1.8221	2.0824	2.3427	2.6034	2.8634	3.1237
9	63.617	.2754	.5508	.8262	1.1016	1.3770	1.6524	1.9278	2.2032	2.4786	2.754	3.0294	3.3048
9 $\frac{1}{4}$	67.201	.2909	.5818	.8727	1.1636	1.4545	1.7454	2.0363	2.3273	2.6182	2.9091	3.2000	3.4909
9 $\frac{1}{2}$	70.882	.3068	.6137	.9205	1.2274	1.5342	1.8411	2.1479	2.4548	2.7616	3.0685	3.3753	3.6822
9 $\frac{3}{4}$	74.662	.3232	.6464	.9696	1.2928	1.6160	1.9392	2.2624	2.5856	2.9088	3.2321	3.5553	3.8785
10	78.540	.3400	.6800	1.020	1.3600	1.7000	2.0400	2.3800	2.7200	3.0600	3.4000	3.7400	4.0800

To get the capacity for a stroke longer than 12 inches, add the capacities of any two strokes that total the desired stroke. In other words a 16" stroke is the equivalent of 2—8" strokes or a 10" and a 6" stroke, etc.



TABLE NO. 7—THEORETICAL DISCHARGE OF NOZZLES IN U. S. GALLONS PER MINUTE

Head		Velocity of Discharge Feet per Sec.	Diameter of Nozzle in Inches									
Pounds	Feet		1/16	1/8	3/16	1/4	5/8	1/2	5/8	3/4	7/8	1
10	23.1	38.6	0.37	1.48	3.32	5.91	13.3	23.6	36.9	53.1	72.4	94.5
15	34.6	47.25	0.45	1.81	4.06	7.24	16.3	28.9	45.2	65.0	88.5	116.
20	46.2	54.55	0.52	2.09	4.69	8.35	18.8	33.4	52.2	75.1	102.	134.
25	57.7	61.0	0.58	2.34	5.25	9.34	21.0	37.3	58.3	84.0	114.	149.
30	69.3	66.85	0.64	2.56	5.75	10.2	23.0	40.9	63.9	92.0	125.	164.
35	80.8	72.2	0.69	2.77	6.21	11.1	24.8	44.2	69.0	99.5	135.	177.
40	92.4	77.2	0.74	2.96	6.64	11.8	26.6	47.3	73.8	106.	145.	189.
45	103.9	81.8	0.78	3.13	7.03	12.5	28.2	50.1	78.2	113.	153.	200.
50	115.5	86.25	0.83	3.30	7.41	13.2	29.7	52.8	82.5	119.	162.	211.
55	127.0	90.4	0.87	3.46	7.77	13.8	31.1	55.3	86.4	125.	169.	221.
60	138.6	94.5	0.90	3.62	8.12	14.5	32.5	57.8	90.4	130.	177.	231.
65	150.1	98.3	0.94	3.77	8.45	15.1	33.8	60.2	94.0	136.	184.	241.
70	161.7	102.1	0.98	3.91	8.78	15.7	35.2	62.5	97.7	141.	191.	250.
75	173.2	105.7	1.01	4.05	9.08	16.2	36.4	64.7	101.	146.	198.	259.
80	184.8	109.1	1.05	4.18	9.39	16.7	37.6	66.8	104.	150.	205.	267.
85	196.3	112.5	1.08	4.31	9.67	17.3	38.8	68.9	108.	155.	211.	276.
90	207.9	115.8	1.11	4.43	9.95	17.7	39.9	70.8	111.	160.	217.	284.
95	219.4	119.0	1.14	4.56	10.2	18.2	41.0	72.8	114.	164.	223.	292.
100	230.9	122.0	1.17	4.67	10.05	18.7	42.1	74.7	117.	168.	229.	299.

NOTE:—The actual quantities will vary from these figures, the amount of variation depending upon the shape of nozzle and size of pipe at the point where the pressure is determined. With smooth taper nozzles the actual discharge is about 94 per cent of the figures given in the tables.



TABLE NO. 8—COMPARATIVE EQUIVALENTS OF WATER MEASURES AND WEIGHTS

Measures and Weights for Comparison	Measure and Weight Equivalents of Items in First Column						
	U. S. Gallon	Imperial Gallon	Cubic Inch	Cubic Foot	Cubic Metre	Litre	Pound
U. S. gallon.....	1.	.833	231.	.1337	.00378	3.785	8.33
Imperial gallon.....	1.20	1.	277.27	.1604	.00454	4.542	10.
Cubic inch.....	.0043	.00358	1.	.00057	.000016	.0163	.0358
Cubic foot.....	7.48	6.235	1728.	1.	.02827	28.312	62.355
Cubic metre.....	264.17	220.05	61023.	35.319	1.	1000.	2200.54
Litre.....	.26417	.2200	61.023	.0353	.001	1.	2.2005
Pound.....	.12	.1	27.72	.016	.00045	.454	1.
1 barrel.....	31.5	26.2	7277.	4.19	.1185	118.6	262.4



TABLE NO. 9—MECHANICAL AND HYDRAULIC EQUATIONS

Area of circle = dia. squared x .7854

Circumference of circle = dia. x 3.1416

1 U. S. gallon of fresh water = 231 cu. inches

1 U. S. gallon of fresh water weighs 8.33 lbs.

1 U. S. gallon of sea water weighs 8.547 lbs.

1 Imperial gallon of fresh water = 277.274 cu. inches

1 Imperial gallon of fresh water weighs 10.005 lbs.

1 Imperial gallon of sea water weighs 10.266 lbs.

Doubling a pipe diameter quadruples its capacity

Areas of circles are to each other as the squares of their  
respective diameters

A miner's inch of water is equal to approximately 11½

U. S. gallons per minute



TABLE NO. 10—WEIGHT OF WATER CONTAINED IN ONE FOOT LENGTH OF PIPE OF DIFFERENT SIZES

Size	Pounds	Size	Pounds	Size	Pounds
1/2	.086	2	1.372	4	5.488
1	.343	2 1/2	2.159	4 1/2	6.966
1 1/4	.537	3	3.087	5	8.575
1 1/2	.774	3 1/2	4.214	6	12.348

Multiply by number of feet high or head.

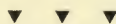


TABLE NO. 11—WIRE SIZE (RUBBER COVERED) REQUIRED TO CARRY VARIOUS CURRENTS WITH 5% ALLOWABLE VOLTAGE DROP

Distance Feet One Way	Voltage	Amperes													
		2	3	4	5	6	7	8	9	10	15	20	25	30	35
50 feet	32	12	12	12	12	12	12	12	12	12	12	12	10	8	8
	110	14	14	14	14	14	14	14	14	14	14	14	12	10	8
	220	14	14	14	14	14	14	14	14	14	14	14	12	10	8
100 feet	32	12	12	12	12	12	12	12	12	12	10	8	8	6	6
	110	14	14	14	14	14	14	14	14	14	14	12	10	8	8
	220	14	14	14	14	14	14	14	14	14	14	12	10	8	8
150 feet	32	12	12	12	12	12	10	10	10	10	8	6	6	4	4
	110	14	14	14	14	14	14	14	14	14	12	12	10	8	8
	220	14	14	14	14	14	14	14	14	14	14	12	10	8	8
200 feet	32	12	12	12	12	10	10	10	8	8	6	6	4	4	2
	110	14	14	14	14	14	14	14	12	12	12	10	10	8	8
	220	14	14	14	14	14	14	14	14	14	14	12	10	8	8
300 feet	32	12	12	10	10	8	8	8	6	6	4	4	2	2	1
	110	14	14	14	14	12	12	12	12	12	10	8	8	6	6
	220	14	14	14	14	14	14	14	14	14	12	12	10	8	8
400 feet	32	12	10	10	8	8	6	6	6	6	4	2	2	1	0
	110	14	14	14	14	12	12	12	10	10	8	8	6	6	6
	220	14	14	14	14	14	14	14	14	14	12	10	10	8	8
500 feet	32	12	10	8	8	6	6	6	4	4	2	2	1	0	00
	110	14	14	14	12	10	10	10	10	10	8	6	6	4	4
	220	14	14	14	14	14	14	14	12	12	10	10	8	8	8



TABLE NO. 12—HOW TO CALCULATE PULLEY SIZES

The driving pulley is called the Driver, and the driven pulley the Driven.

If the number of gear teeth is used instead of diameter, then the number of teeth must be substituted wherever diameter occurs.

To find the Diameter of Driven, the diameter of the Driven and its revolutions per minute, and also revolutions of Driver being given: Multiply the diameter of Driven by its revolutions, and divide the product by the revolutions of Driver; the

quotient will give the diameter of the Driver.

To find the Diameter of Driven, the revolutions of the Driven, also diameter and revolutions per minute of the Driver being given: Multiply the diameter of Driver by its revolutions, and divide the product by the revolutions of the Driven; the quotient will give the diameter of the Driven.

To find the Revolutions of the Driver, the diameter and revolutions per minute of the Driven, also diameter of the

Driver being given: Multiply the diameter of Driven by revolutions, and divide the product by the diameter of the Driver; the quotient will give the revolutions per minute of Driver.

To find the Revolutions of the Driven, the diameter and revolutions per minute of the Driver, also diameter of the Driven being given: Multiply the diameter of Driver by its revolutions, and divide the product by the diameter of Driven; the quotient will give the revolutions per minute of Driven.



TABLE No. 13—MECHANICAL AND HYDRAULIC TERMS AND EQUATIONS

**Feet Head:** To get the feet head when pounds pressure are given, multiply by 2.3 (2 is close enough for all practical purposes).

**Pounds Pressure:** To get the pressure in pounds per square inch when the elevation of feet head are given, multiply by 0.434 or, roughly speaking, divide by 2.

**Total Head:** In pumping water, the total head is the sum of the suction distance, (the lifting distance in the case of a deep well system) the discharge elevation, and the friction head of the water in the pipe.

**Friction:** Friction of liquids in pipes increases as the square of the velocity.

**Velocity:** Velocity in feet per minute necessary to discharge a given volume of water in a given time is found by multiplying the number of cubic feet of water by 1.44 and dividing the product by the area of the pipe in square inches.

**Area:** To get the area of a pipe or any circle, square the

diameter and multiply by .7854. (See table number 6 for areas.)

**Tank Capacity:** To find the capacity in gallons of any cylinder tank or cistern, square the diameter (in feet) multiply by .7854. Multiply this by the height in feet and by 7.48. (See table 4.)

**Cylinder Capacity:** To find the capacity of any pipe or cylinder in gallons, multiply the square of the diameter in inches by the length in inches and multiply the product by .0034. (See table number 6, and capacities of common size cylinders.)

**Pump Capacity:** To get the capacity of any single acting pump, multiply the cylinder displacement per stroke in gallons (Table 6) by the number of strokes per minute. This will give you the gallons per minute. To get the gallons per hour, multiply by 60. In the case of a double acting pump multiply the result by 2.

**Foot Pound:** A foot pound is the unit of work. When one pound is raised a distance of

one foot, one foot pound of work is expended. Foot pounds are the product of the weight in pounds and the vertical distance in feet. 10 pounds raised 5 feet equals 50 foot pounds, etc.

**Horse Power:** A horse power is 550 foot pounds per second or 33,000 foot pounds per minute.

**Efficiency:** The ratio of the amount of work secured from a machine to the amount of work or energy put into it. The ratio of output to input, so to speak. This figure is always less than 100%.

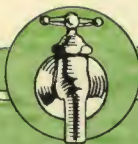
**Horse Power Required to Operate a Pump:** First convert the number of gallons to be handled per minute to pounds (multiplying the number of gallons by 8.33 in the case of water). Multiply the product by the total head in feet, and divide by 33,000 times the efficiency of the pump. A simple and approximate formula for determining the horse power required to lift water is as follows:

Horsepower equals

$$\frac{\text{Total head in ft.} \times \text{G.P.M. delivered}}{4000 \times \text{efficiency of pump}}$$

▼ ▼ ▼





## FAIRBANKS-MORSE INDUSTRIAL PUMPS

Fairbanks-Morse industrial pumping equipment has earned a reputation for reliability—a reputation that should be significant to all buyers of pumps for large or small jobs.

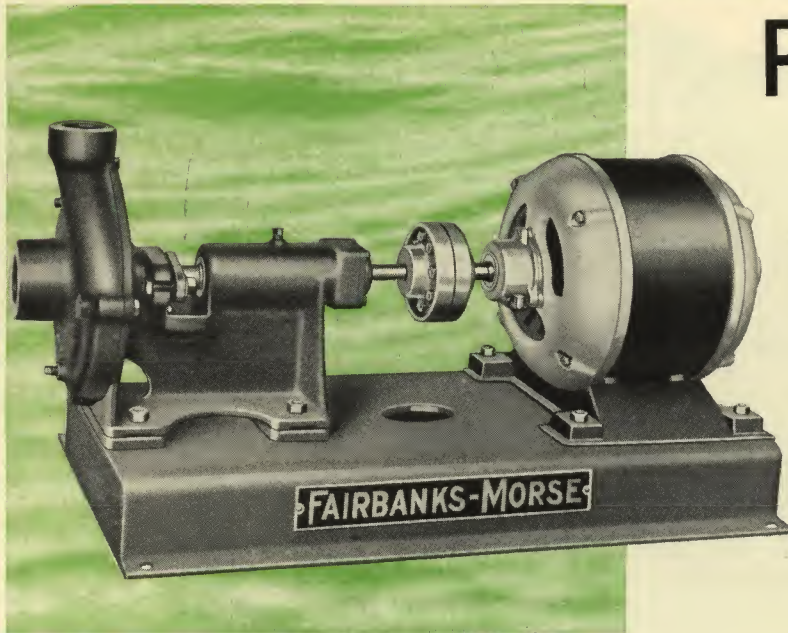
The performance record of F-M installations is founded upon two factors. First, the quality of the equipment. Back of every F-M pump and motor are more than 50 of years experience as pioneers in water works construction and the resources of one of the world's largest pump and motor manufacturers. Second, the proper application of equipment. Fairbanks-Morse combined knowledge of power and pumping assures a perfect balance between units and a close application to specific problems.

Fairbanks-Morse pumps are built in many types and capacities—from deep well turbines to huge centrifugal and propeller-type pumps. Information on a few of the pumps comprising this line is given in the following pages. Further details or information describing pumps for other requirements will be furnished upon application to any of the Fairbanks-Morse Branches.





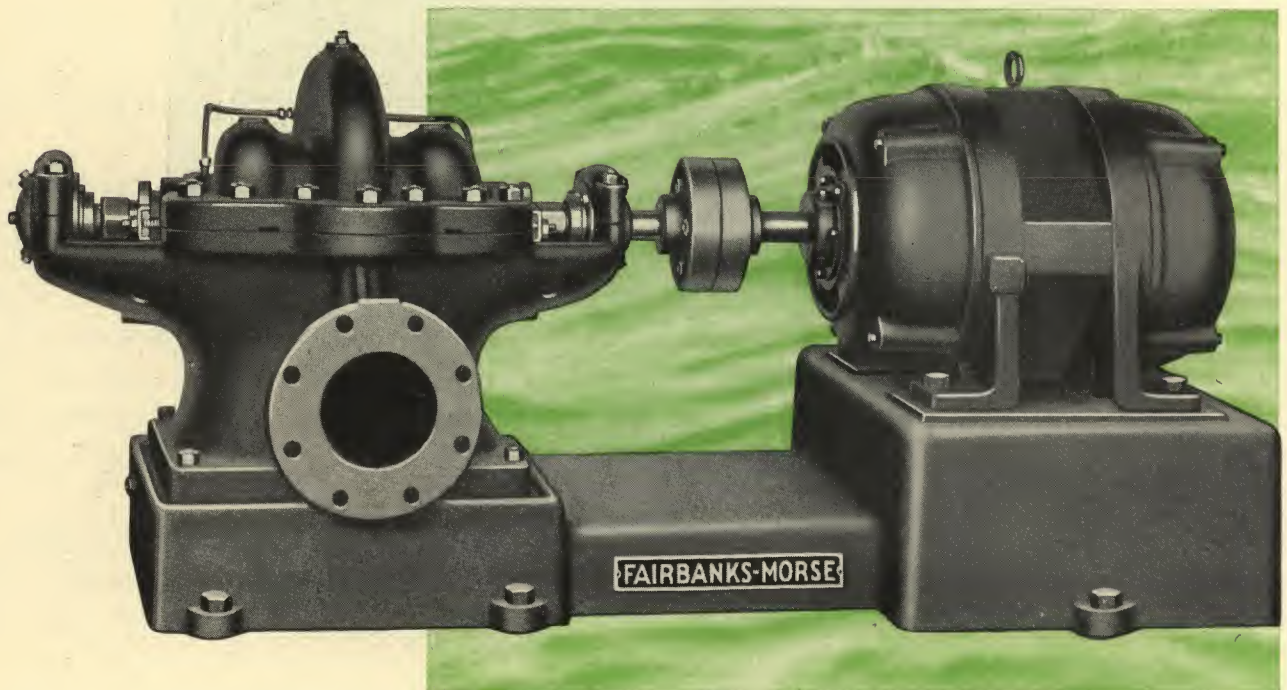
# Fairbanks-Morse Centrifugal Pumps for...



The F-M Fig. 5520 and 5530 series ball-bearing centrifugal pumps shown at the left are moderately priced, highly-efficient units. They are of compact sturdy construction, especially designed for general service and heavy duty in sizes from 1 to 8 inches, for capacities from 25 to 1000 g.p.m. against heads up to 135 ft. Equipped with F-M ball-bearing motors, they make up complete ball-bearing units free from the mechanical troubles experienced when sleeve bearings are used.

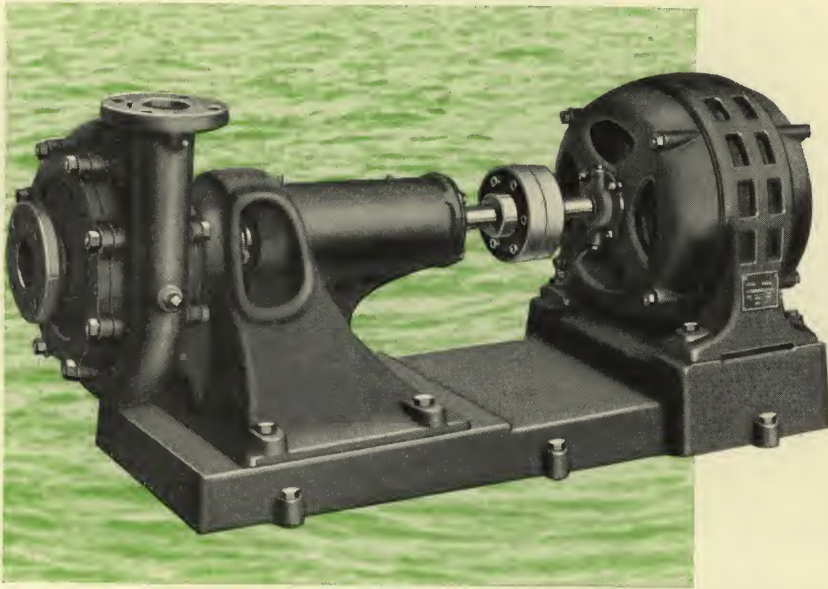
Fairbanks, Morse & Co. has developed a line of split-case centrifugal pumps—revolutionary in mechanical construction and hydraulic design. Perfected as the result of vast experimental and field research over a period of years, these pumps in mechanical construction far out-rank all pumps previously available.

They are known as Fig. 5803 series, a typical unit being illustrated below. Hydraulically almost perfect stream lining of flow results in unusually high built-in efficiency. This efficiency is sustained through an especially long life because it is not dependent on close clearances of the wearing ring nor on high polish of the impeller or volute. Fig. 5803 series pumps are available in sizes from 1½" to 8" with a wide capacity-head coverage.





# ...Every Industrial and Municipal Requirement



The F-M sewage and trash pumps illustrated on this page are designed for the economical handling of fluids containing large solids and much foreign matter, such as flexible trash. These pumps have two very definite advantages which greatly influence the efficiency and economy of operation; first, continuity of performance without clogging, second, elimination of the necessity and expense of screening out solid material in the fluids to be handled. The impeller will pass anything that enters the suction nozzle.

These pumps are adaptable for pumping sanitary sewage, tannery waste, beet pulp in sugar mills, paper stock and other fluids with material in suspension. In construction and drainage service they can be used to great advantage where the water to be pumped contains rubbish, roots, sods, weeds or other objects which clog ordinary centrifugal pumps.

The horizontal-type pump shown above is made in sizes from 2 to 20 inches, with a wide capacity-head range.

The vertical-type pump shown at the right has similar capacity and head ratings and is made in the same sizes. The ball bearings of the Fairbanks-Morse sewage and trash pumps are mounted outside of the pump proper and consequently cannot be affected by material passing through the pump.





# Fairbanks-Morse Fig. 5510 Centrifugal Pumps

side suction  
highly efficient  
low price

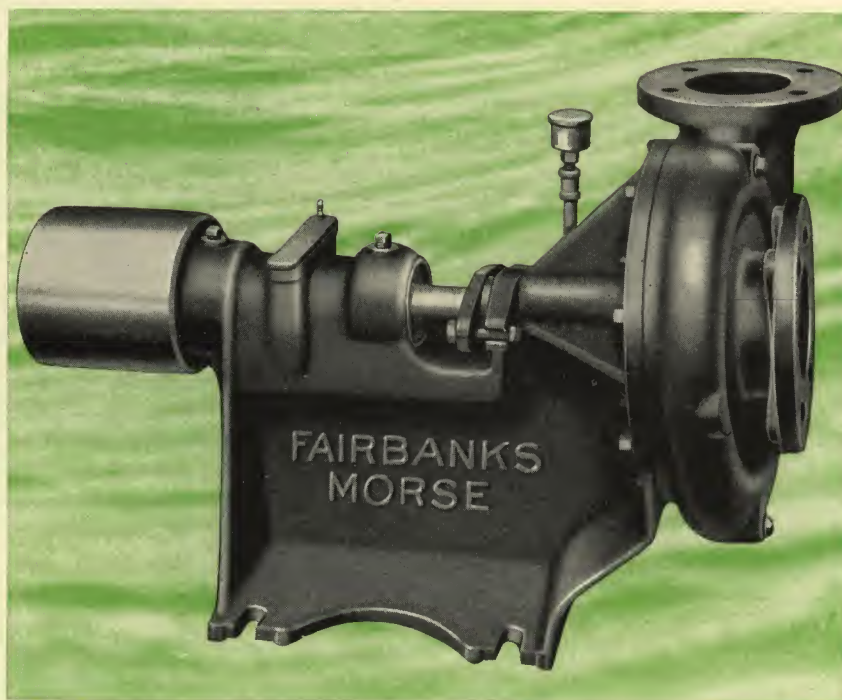
The Centrifugal Pumps listed here are of the single-stage, side-suction type for general water supply and industrial service. They are part of a complete line of centrifugal pumps which are well known for their efficiency, durability, dependability, and smooth running qualities.

Fig. 5510 centrifugal pumps are of compact sturdy construction especially designed for general service and heavy duty in sizes from one to eight inches for capacities from 25 to 2200 gallons per minute against heads up to 120 feet.

Quantity production assures well built pumps at moderate prices. The use of metal patterns, complete sets of jigs and fixtures, and scientific methods for balancing pump impellers, insure uniformity of production and enable the user to obtain accurately fitting repair parts with promptness.

Open impellers are used on all sizes. Frames are cast in one piece, and are heavy and rigid so as to take care of internal pressure, as well as support the bearings and resist belt-pull without distortion.

Renewable die-cast babbitted



A 3" Fig. 5510 Centrifugal Pump.

boxes are used for the frame bearings and provision is made for ample lubrication by use of ring oiling.

All sizes are furnished for belt drive. These pumps are particularly adapted to irrigation, circulation, industrial purposes and general service where total heads do not exceed 120

feet.

The table below shows the normal or average capacity of the pumps listed. When pumping these amounts the discharge velocity is well within the limits of conservative practice.

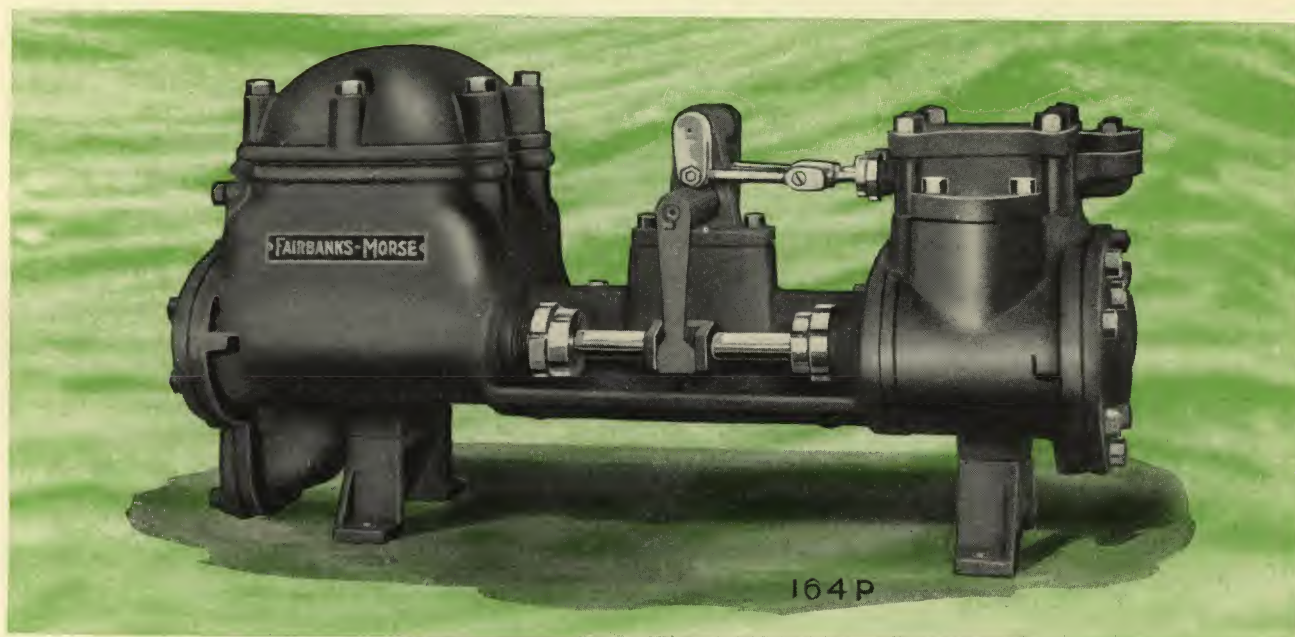
For further data on these pumps, ask for special bulletins.

Capacities and Prices of Fig. 5510 Centrifugal Pumps

Number of Pump and Size of Discharge, Inches	Size of Suction, Inches	Normal Capacity		Standard Pulley		Shipping Weight, Pounds	Code Word	Price
		U. S. Gallons per Minute	Imperial Gallons per Minute	Diameter, Inches	Face, Inches			
*1	1 1/2	60	50	4	3	42	WAHLR	\$ 19.20
*1 1/2	2	125	104	5	4	85	WAHMS	30.60
*2	3	250	208	6	5	151	WAHNT	61.00
3	4	450	375	6	5	177	WAHOU	67.10
4	5	700	583	8	6	232	WAHPV	101.00
5	6	900	750	8	6	242	WAHRX	128.00
6	8	1400	1167	10	10	352	WAHSY	167.00
8	8	1600	1333	10	10	380	WAHTZ	212.00

\*Suction and discharge connections are tapped in volute on these sizes.





## General Service or Boiler-Feed Steam Pumps Duplex Piston Type

Fairbanks - Morse General Service or Boiler-Feed Steam Pumps are adapted to many classes of general pumping and have a wide range of application. They are used extensively in municipal water plants, railroad water stations, office buildings, public institutions, factories, hotels, hospitals, refrigerating plants, etc.

While there are a number of types of Fairbanks-Morse Pumps adapted for general service pumping and for boiler-feed purposes, only a few sizes

are listed in the table below, all of which are well proportioned for that particular service when pumping clean water.

The ratings given below are conservative, and while any of these pumps can be operated, under suitable conditions, from 25 to 50 per cent faster than the ratings given, it is evident that if pumps are selected on the basis of conservative rating, it will result in increased life and decreased maintenance.

The high degree of serviceability and dependability of

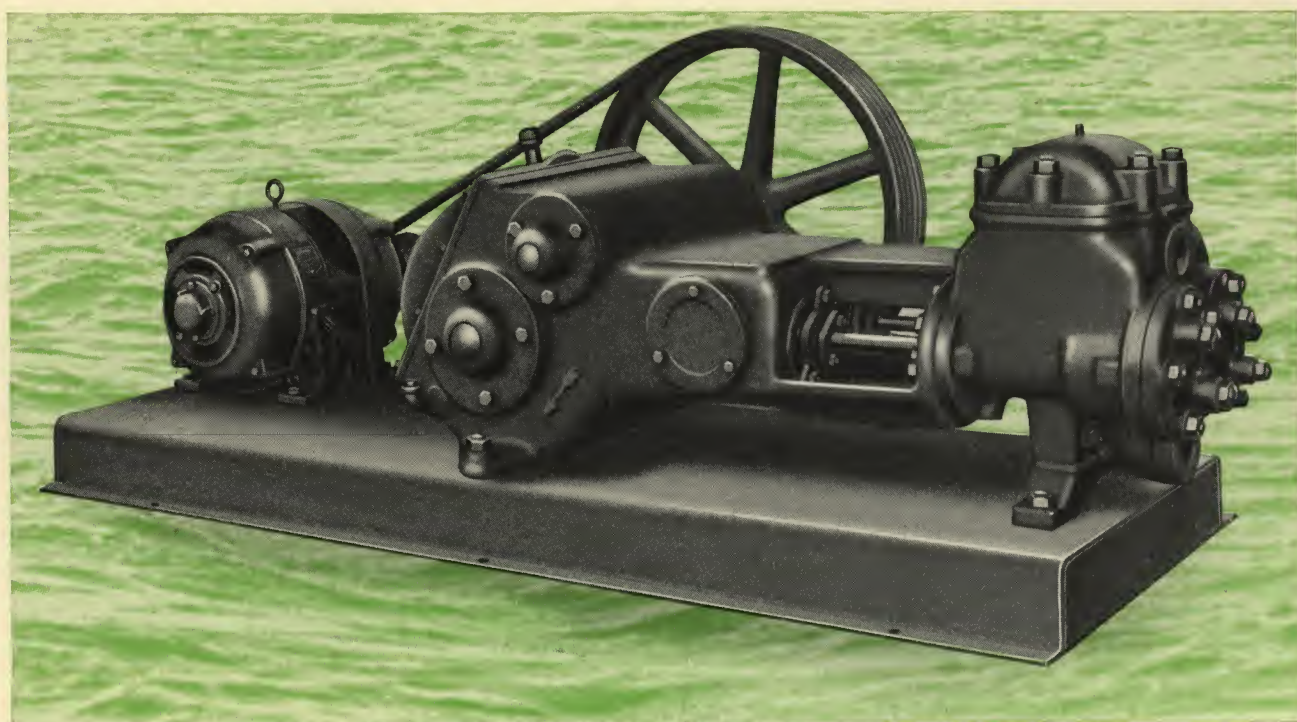
these pumps is a result of numerous refinements in design and construction. A few of these refinements are: the metal patterns used in making the castings; the excellent machine work throughout; and the drop-forged valves and valve stems. These features augmented by many others, lead to uniformity and accuracy in castings, correctness in assembly, uniform distribution of metal to give maximum strength and ultimately, efficient and economical service.

Sizes and Capacities of General Service or Boiler-Feed Steam Pumps

Outfit No.	Dia. of Steam Cyl., In.	Dia. of Water Cyl., In.	Lgth. of Stroke, In.	*Displacement in U. S. Gals. per Stroke of One Piston	*Displacement in U. S. Gals. per Min. at Rated Speed	*Displacement in Imperial Gals. per Min. at Rated Speed	H.P. of Boilers Pump will Supply at an Easy Speed	Diameter of Pipe for Short Lengths, In.				Floor Space, In.	Approx. Shpg. Wt., Lbs.	Code Words
								Steam	Exhaust	Suction	Discharge			
5529	3	2	4	.05	11	9	75	$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{1}{4}$	1	30x11	185	WRAAE
5530	$4\frac{1}{2}$	3	4	.12	25	21	150	$\frac{1}{2}$	$\frac{3}{4}$	2	$1\frac{1}{2}$	35x13	340	WRABF
5531	$5\frac{1}{4}$	$3\frac{1}{2}$	5	.20	40	33	300	1	$1\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{1}{2}$	39x16	460	WRACG
5532	6	4	6	.33	58	48	450	1	$1\frac{1}{2}$	3	2	45x17	645	WRADH

\*Capacities are based on actual piston displacement, deducting rod. Any of the above pumps will be furnished brass-fitted, if specified.





## Enclosed Self-Oiling Duplex Power Pumps Removable Cylinder—Piston Pattern—Back Geared

For general pumping duty, up to 22 feet lift and against pressures varying from 175 to 300 pounds, according to size of cylinder selected.

Fairbanks - Morse Enclosed Self-Oiling Power Pumps are designed for pumping water or oil at pressures up to 300 pounds per square inch. Because of their simplicity and sturdy construction, they give assurance of dependable, steady service. These pumps are being used in connection with water systems in large country homes, country clubs, village water works, water stations, office buildings, refrigerating plants, and other places where the water to be pumped does not contain a large proportion of solid matter. They also find extensive application in oil-field service.

These pumps are entirely self-oiling, and thorough and positive lubrication of all working parts is assured. Oil cups, grease cups and other lubricating devices have been eliminated. No attention is required

other than to maintain a supply of oil in the reservoir that feeds the lubrication system. Reducing the attention needed makes these pumps especially desirable for installations in remote and inaccessible locations.

The power end is completely enclosed, thereby excluding dirt and preventing accidental contact with moving parts. A removable cover bolted to the crank end of the frame permits easy access to parts in the power end. The cover and frame are machined, and provided with a gasket, making an oil tight fit.

These pumps also have many other desirable features such as drop forged crankshaft, machine cut gears, etc. Various sizes are fitted with removable cylinders and pistons which can be replaced quickly and easily, and which can be changed so that cylinders and

pistons of different diameters can be substituted to obtain operating characteristics to meet different service conditions.

These pumps are built with pulley for belt drive; with electric motor and Flex-Mor drive as shown above; and with "Z" Engine connected by an Eclipse friction clutch. If the service for which the engine driven outfit is desired is such as to make it necessary to start the pump against high pressure, the engine can be started at no load and by means of the friction clutch the pump started and stopped at will while the engine is in operation. Each combination is entirely F-M designed and built, and is a self-contained unit.

For more detailed information on these and larger power pumps of the same type ask for special bulletin.

















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